In This Issue—*Duplication of Parts Stocks*

# MOTOR AGE

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Number 12

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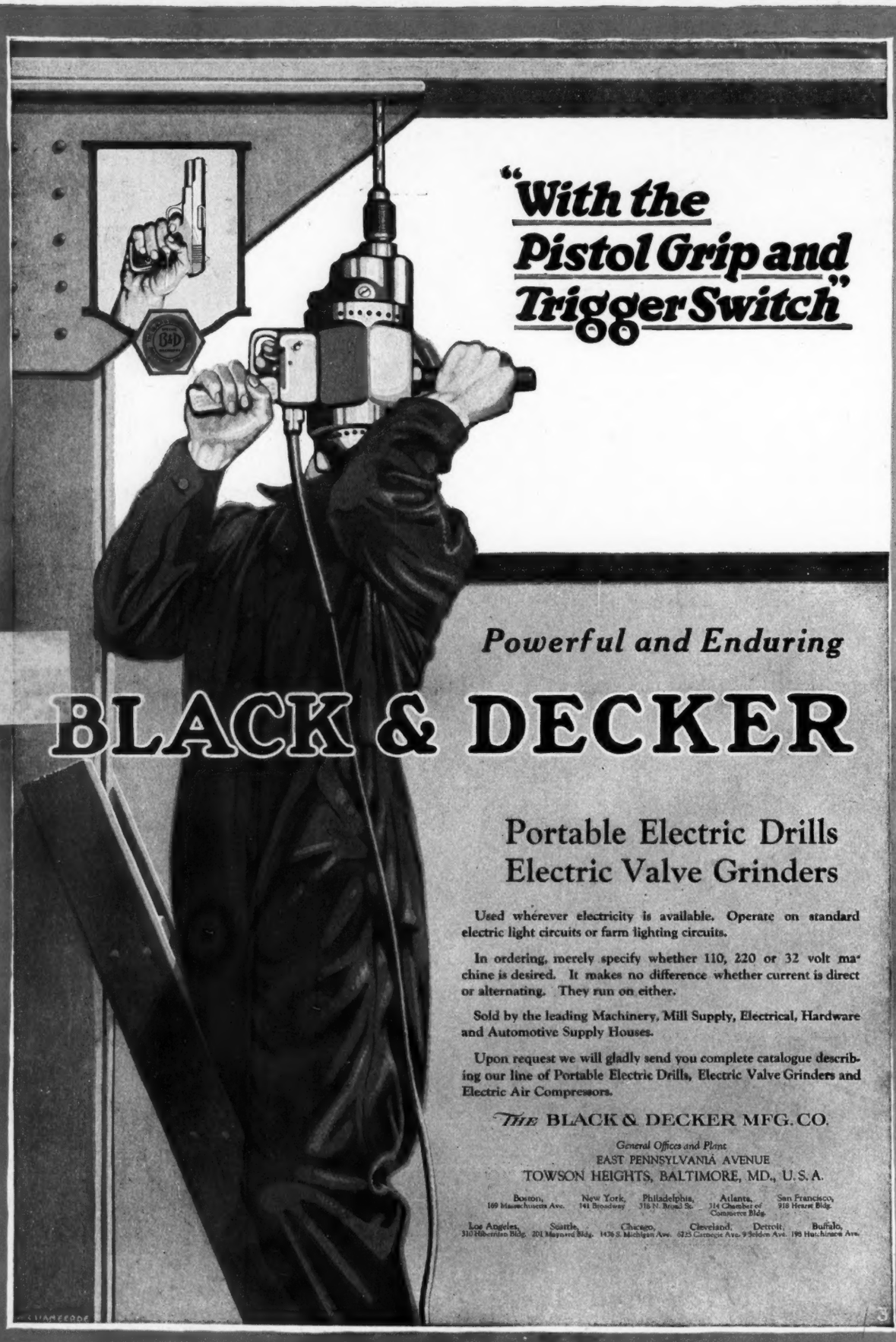


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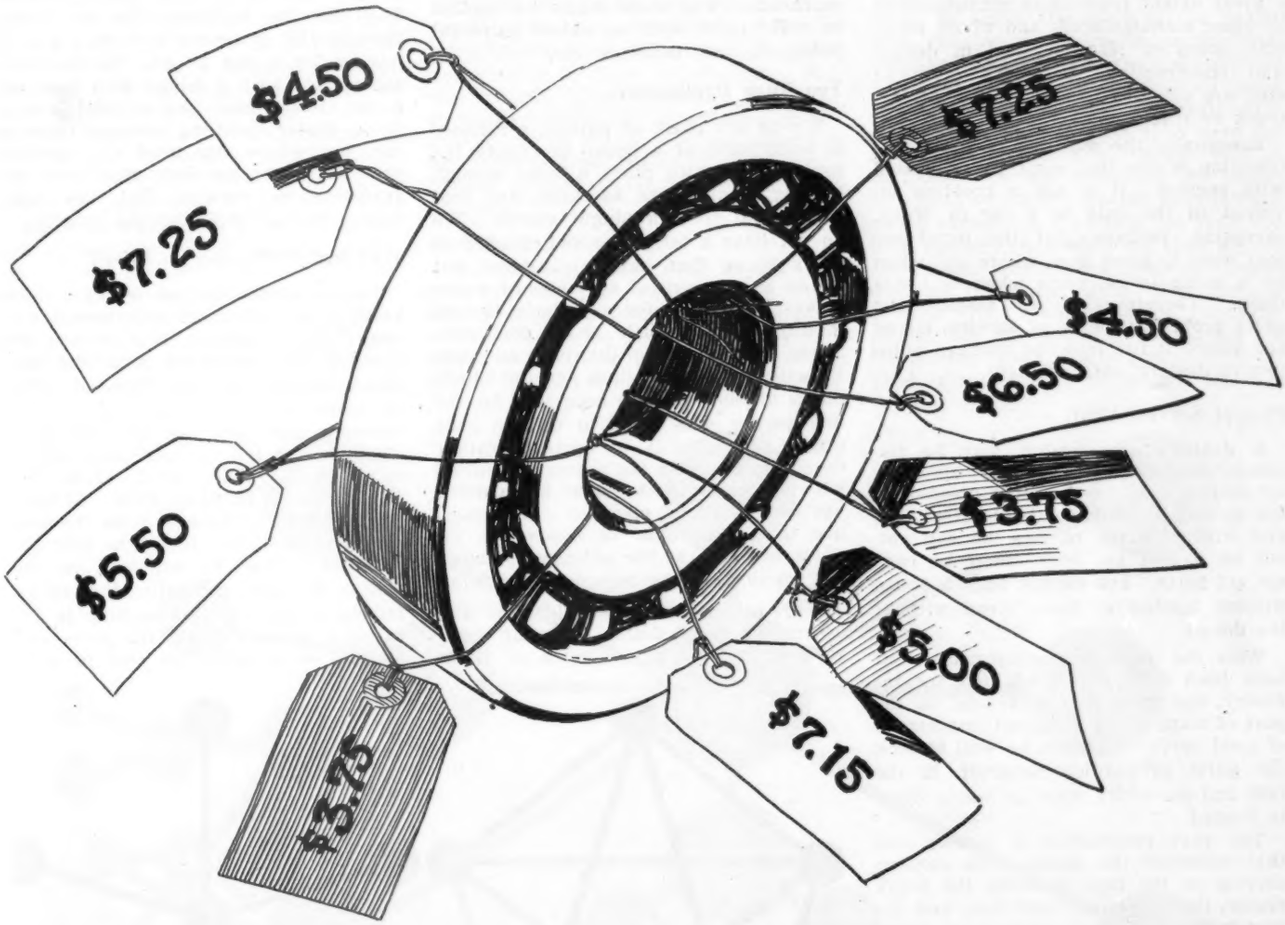
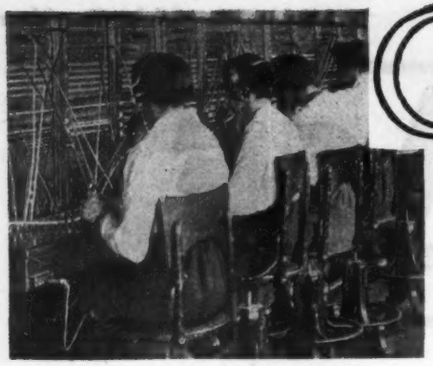
# MOTOR AGE

## What Does It Cost?

*Why the Great Variation in the Price of Identical Parts Used in Cars, Trucks and Tractors?*




"WHAT does it cost?" That's exactly the question that was asked a dozen or so times the other day regarding a certain bearing used in as many different makes of cars. To make a long story short a dozen dealers or their service stations quoted the prices shown on this page for a bearing that was identical as to size, type, etc. The thought behind the whole thing is simply this: If a dealer knows that he can get a certain part used in his car for about half the cost from some source other than his own factory he probably will do so, assuming, of course, that we are devoting our thoughts to the assembled car, truck or tractor. Many in the industry have expressed themselves in favor of central distributing stations or depots from which parts used in automotive apparatus can be distributed to all comers under the same conditions. It would do way with conditions such as pictured above. They hold, and protect the manufacturer, distributor and dealer alike from the pirate parts business, a business which if not curbed in time may cut the very throats of those whom it is designated to help. Other industries have profited through the use of central stations for distribution of commodities and maybe the automotive industry is in line to follow some such plan in the next few years.



# Can We Learn from

## *Would It Be of Benefit to the Industry to Establish Unit and Parts Depots in the Larger Cities and Thus Decrease the Dealer's Costly Parts Stock?*

SOME investigations extending over a period have opened up the question as to whether or not there might be a beneficial change in the automotive industry relative to the distribution of automobile, truck and tractor parts. Let it be understood at the outset that we are confining ourselves to such cars, trucks or tractors as are assembled to a great extent from units manufactured by other manufacturers and whose products, more or less identical in design and construction, and very often in size, are supplied to any number of car, truck or tractor makers.

Essentially the question of parts distribution is one that must be associated with service It is not a problem involved in the sale of a car or truck, excepting, perhaps that the purchaser may want to know how, where and when he is going to get parts when he needs them. Therefore, if we assume the parts problem a phase of service, let us see where it fits into the average automotive dealers' establishment.

### Prompt Service Vital

A dealer's organization may be the best of its kind in the country, his service station may be the most up-to-date, his mechanics may be the most skilled and willing bunch of men he can get, but he cannot get very far if he cannot get parts. You cannot build a house without lumber or bake bread without the dough.

With the various readjustments that have been going on throughout the industry, and with the awakening on the part of many as to the great importance of good service it might be well to look the parts proposition squarely in the face and see which way the whole thing is headed.

The part proposition is largely one that concerns the dealer who renders service on the cars he sells, the truck dealer, the exclusive repairshop, and the customers who buy automotive apparatus. Most every dealer of any account stocks quite a number of parts under his roof and in some of the larger centers a stock valued at $50,000 or even $100,000 is common. Needless to say it represents a considerable investment in itself to say nothing of the money required to run such a department.

There may be a dozen dealers in a town representing so many makes of cars and for argument sake let us assume all of the dozen different makes of cars use the same transmissions and clutches. Let us also assume that each dealer has a stock of clutch and transmission parts valued at $1,000. This would mean $12,000 worth of parts for the same clutches and transmissions scattered over a dozen different places in the town and under twelve different overheads. The same might be applied to other units such as axles, universal joints, engines, bearings, etc.

### Too Much Duplication

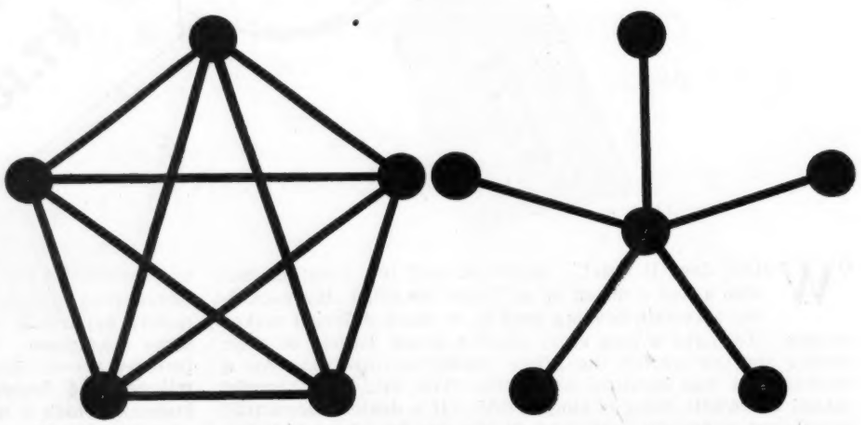
We do not think of putting a furnace in each room of a house to supply the heat. Rather we place a large enough heating plant in the basement and feed each room from a single source We do not have a telephone switchboard in every house that has a telephone, but we do have a central switchboard which makes it possible for everybody to talk to anybody with little or no confusion. Study the diagram on this page and note the criss-crossing of lines and the superfluous number of lines necessary for the five parties who want to talk to each other but without a central station. Compare this with the adjacent diagram wherein is shown the same five parties, but with a central operator. In a measure this idea might be applied to the parts business of the automotive industry, particularly as regards distribution.

Why, asks someone, should it be necessary for every dealer to tie up space with a valuable stock, much of which has a slow turnover? Why the tremendous duplication of stocks? And why the difference in price of the same article in different establishments? Let's give you an instance of the latter.

A man in one large city wanted to buy a clutch pilot bearing for his car and sought the dealer from whom he had bought the car. This dealer wanted $5.50 for the bearing. The car owner thought this price too high and put off buying for a day or so. He discussed the matter with a friend who also was a car owner and who advised him to try a dealer handling another make of car, but whose car used the identical part as in the previous mentioned car. Investigation showed that the latter dealer wanted $6:50 for the bearing.

### Why Such Difference in Price?

The car owner decided to do a little investigation for himself and through various channels picked ten dealers who handled cars equipped with the same make, model, size and type of clutch. He made inquiry at each dealer's establishment and here are the ten figures cited by the ten dealers' parts departments—$4.50, $7.25, $5.50, $7.25, $6.50, $3.75, $5.00, $7.15, $3.75, $4.50. Of course the man bought the part from the dealer who wanted $3.75. It is true that some variation might be expected in these prices because naturally the concern buying in the largest quantities is going to get a better price on the parts, but it is hard to imagine the cost of a part



Here is what a central station does for the telephone companies. Note the lines necessary in the diagram on the left, when five parties desire to talk with each other and without a central operator. On the right, the simplified system which produces the same results

# the Telephone Exchange?

being nearly doubled, as is the case in the price of the pilot bearing above.

It is the thought of many that parts might better be handled from central distributing depots. For example there might be one of these depots in New York, Chicago, Cleveland, Omaha, Minneapolis, Denver, Dallas, etc. These depots of clearing houses would take care of the distribution of any number of parts makers' products, not the complete units, necessarily, but the parts that go to make up the unit.

**Saves Time and Cuts Detail**

This would mean that most dealers could cut down their parts stock in half. In many cases this figure could be still more reduced It would mean less capital invested and as a clearing house or parts depot of this kind would buy in large quantities, a better price would be assured the dealer. Furthermore, it would relieve the dealer and distributor of a vast amount of detail work in the ordering of parts from the factory. There would be no waiting for parts during the rush season. It would mean a reduction in the dealer's insurance. There would be a saving in time. Instead of the ultimate consumer or the dealer having to go to the distributor, factory and in the long run the parts manufacturer himself, the customer and the dealer can go direct to the parts manufacturer's authorized distributor.

**Help to Fight Bogus Parts**

The centralized parts depot would do away largely with the pirate parts business. The car manufacturer would be assured that the owners of his cars would get duplicate parts of the original parts that went into the car and thus get the good will of his customers. The establishment of parts depots is becoming more and more necessary to combat the distribution of bogus parts.

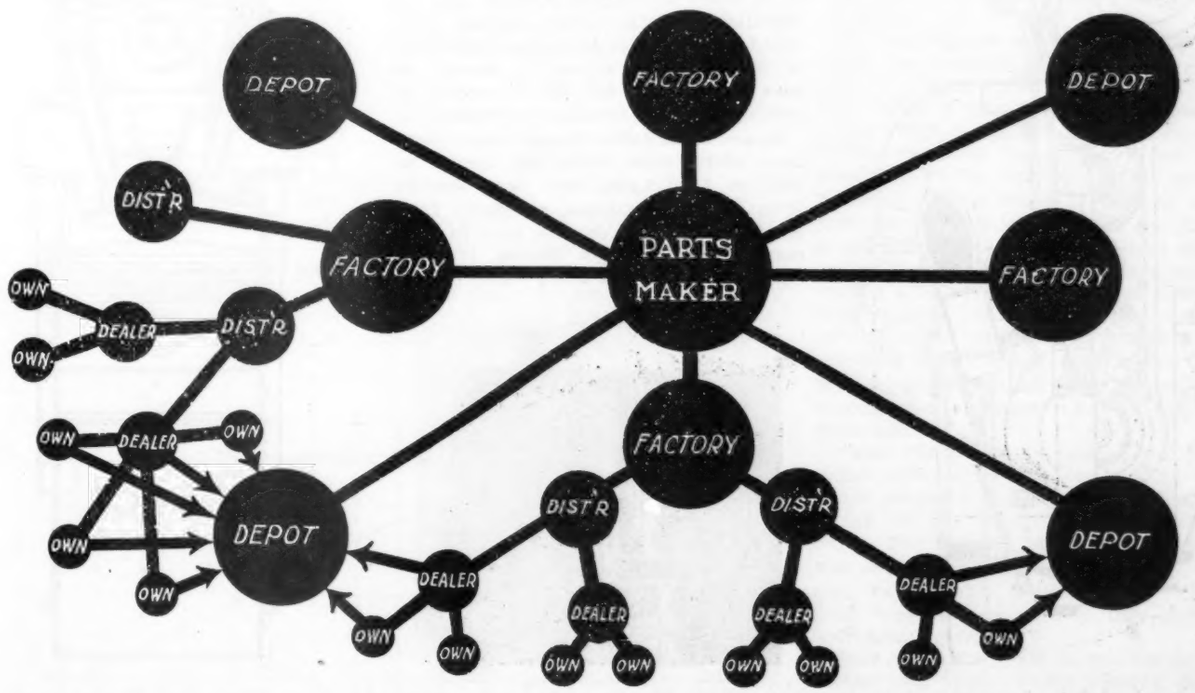
One truck manufacturer in speaking of the establishment of parts depots stated that any truck manufacturer and dealer could buy their parts from the manufacturers at the same discount as they now were getting and still could maintain parts stock if they so desired. But, there would be an advantage under the proposed system by eliminating duplicate stocks in the same cities, inasmuch as the parts depot would carry the stock instead of each dealer having a stock of his own.

**Less Cost to Owner**

It may take some time to get this plan into operation all over the country and in time the volume might be sufficient to enable the parts makers to materially reduce their prices, which would be an advantage from the standpoint of low costs per ton mile to the user. As one parts manufacturer said, there should be no fight between the parts manufacturer and the truck assembler, as both are related—one cannot live without the other. The parts makers do not want to do anything, and cannot afford to do anything, that will hurt the assembler. The fight is between the parts maker and assembler on one side against the so-called truck manufacturer on the other side.

**Reward Good Service**

Here is another angle to the situation. The exclusive repairshop or service station that does work on any make of car, truck or tractor is not allowed the discount on parts, the same as the dealer who handles cars, trucks or tractors. Perhaps the exclusive shop should not get exactly the same discount on parts as the dealer, but what generally happens is that the exclusive shop pays the long price on the part. Some have it that this is wrong because if the exclusive shop or service station is rendering better service on a certain car than the local dealer can render, the shop should be allowed somewhere near the same discount the dealer gets. The thought is that the manufacturer of the car should not discourage good service on his product, even if it is rendered by an establishment that does not sell the car.




Graphic representation as to how parts depots might be established to prevent duplication of parts stocks in the same cities by dealers. The parts maker supplies the factory, or assembler, the factory the distributor, the distributor the dealer and the dealer the customer. Should the parts makers join hands in the establishment of parts depots, dealers and consumers could take the course shown by the heavy arrows

# Smaller Engines—Greater Power

## *A Few Reasons Why Small Piston Displacement Engines Give Such Remarkable Performances on the Race Track*

### By B. M. Ikert

*"BUILD 'em small and run 'em fast," as one noted race engine designer said, is, in a nutshell, the reason why the size of the engine in our race cars has gone down, with an increase, however, in power and speed of the cars. Many will marvel at the high speeds obtained in the races this year, and in order that our readers might know a little more about the why and how of these small engines and their remarkable performances, we give on these pages some of the more important factors contributing to their success.*

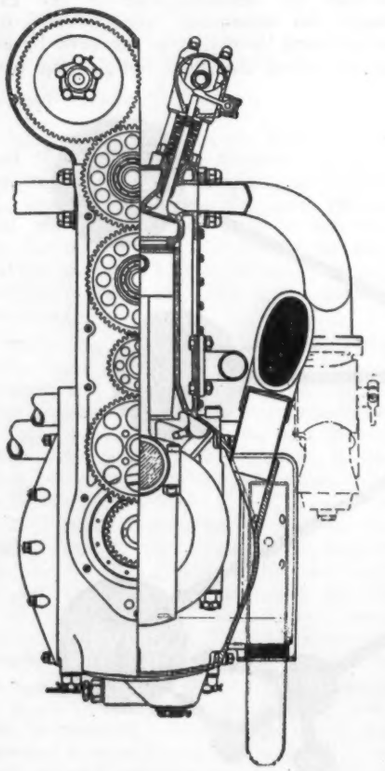
BEFORE many weeks the knights of the gasoline circuit will be battling with one another on the Indianapolis oval for supremacy in the 500-mile automobile race. The race is limited to cars fitted with engines not over 183 cu. in. piston displacement and just as sure as night follows day there will be any number of persons after the race wondering from whence these cars get their tremendous power and speed when many engines in stock cars have a much larger piston displacement, but are not nearly as fast.

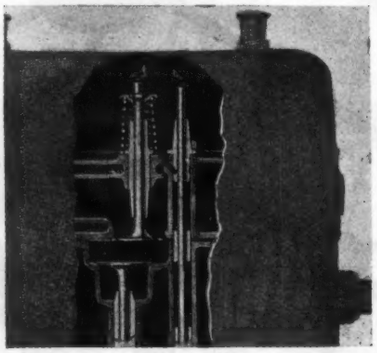
The question that baffles the railbirds at the races is this: Why does an engine with 183 cu. in. piston displacement develop 90 hp. while another engine of say 200 cu. in. develops but 35 or 40?

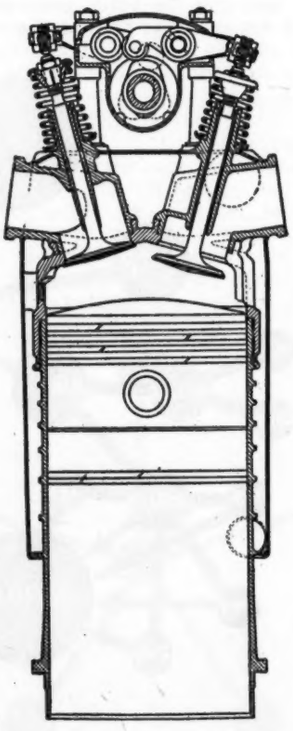
Speed is power. This is a saying that has been associated with the internal combustion engine for a long time, and while it is very true, it is capable of certain modifications. To get a flexible engine it must be capable of developing power over a wide range of speeds, and accordingly carburetion must be such as to make low speeds possible (not an essential factor in racing engines, however,) while the reciprocating parts must be light and the valves big enough to pass the gases in and out as rapidly as possible if high speeds are sought.

Some remarkable things have been done along these lines and speeds as high as 4,000 r.p.m. have been secured from European engines, especially from some of the small engines used in light cars. When we get speeds of 4,000 r.p.m. it means that every valve in that engine opens and closes about thirty times per second, and what's more the piston makes four times that number of strokes in the same time. To go still further, the piston in the one-hundred and twentieth part of a second has to start from rest, get up to its maximum velocity at mid-stroke, come to the top of the cylinder and reverse its direction at the end of the stroke. What is still more remarkable is the fact that the piston starting from rest has to attain a velocity of about a mile a minute within the space of an inch or so and then come to rest again in about the same distance.

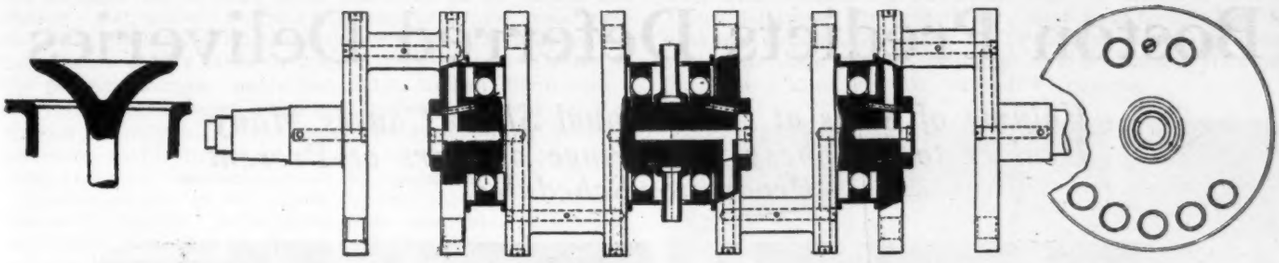
When we compare two engines we must not take into consideration their cubic capacity alone. What we must consider is the question of how many times per minute this cubic capacity is taken advantage of. Power is measured by the work done per minute, from







On the left is shown a cross-sectional view of the Monroe racing engine designed by Louis Chevrolet. This engine is featured with two camshafts. Note the large gas passages. In the center is the valve layout of the Essex engine, a stock design that has resulted in high speeds and power. It is called a super-imposed type, wherein the intake is placed over the exhaust valve. This makes large valves possible. On the right is the Mercedes 260 hp. aircraft engine. This engine uses but one camshaft to operate the valves. Here again the large gas passages can be noticed

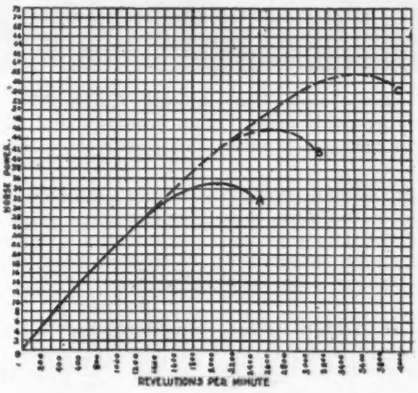


On the left is a tulip type of valve used on one of the foreign racing engines. The design permits of lightness and ample surface for heat radiation. Above is shown the crankshaft of the Monroe racing car. This is mounted on ball bearings. Balancing the crankshaft is one of the most important factors in high speed engines. Contrary to some common thoughts the counter-balancing of a four-cylinder shaft has nothing to do with vibration. Counterbalancing is used in two-bearing shafts to eliminate distortion at high rates of rotation. In a four cylinder engine having more than two bearings, counter-balancing is useful mainly to reduce the pressure on the main bearings at high speeds

which it will be evident that the cylinder developing power two thousand times a minute will give twice as much power to the crankshaft in a minute as one of the same size having a working stroke of only one thousand times a minute.

It is a strange fact that above a certain speed the power developed by an engine falls off. This is shown by the power curves of engines. Up to a certain point the power increases equally with the speed, but after awhile more slowly until it actually falls off. So, if we could improve this last part of the curve, obviously the useful range of engine speed would be increased and it is on this last piece of the curve where our designers have made big strides in the last few years.

There is an engine speed at which the piston actually runs away from the gases so that the real job then is to make the valves and gas passages big enough to retard the gases as little as possible. The gas ports and passages in a racing engine are very much larger than those of a stock touring car engine. This departure from conventional practice helps to make a very fast engine, but it makes starting very difficult. That is why you see mechanics and helpers in a race often struggling with the crank or pushing the car to turn over the engine so that it will fire. The reason for hard starting is this: The gas passages being large have been designed for terrific engine speeds and the gas velocity at cranking speed is so slow that it is almost motionless by comparison. Thus the slow moving air column hardly has sufficient velocity to sustain the gasoline particles or carry them through the cylinders. That's why, too, you often see a mechanic or helper at a race hold his hand over the air intake of the carbureter to enrichen the mixture.




A horsepower curve showing the increase in power obtained by increasing the revolutions per minute

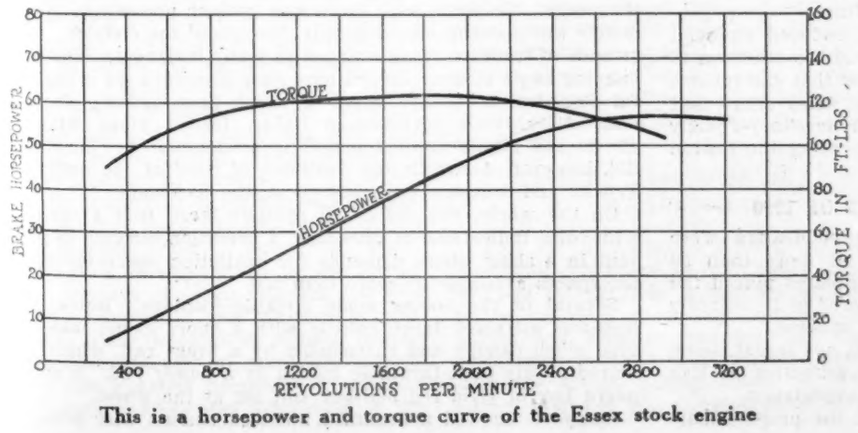
The job of getting enough valve area has been one of the most important problems with which the race engine designer has had to deal. Install as many valves per cylinder as possible seems to have become somewhat of a rule, but there are limits in this respect, because when we get over four valves per cylinder we run into cooling difficulties. Most of the well known racing engines like the Duesenberg, Monroe, Frontenac and Ballot, have four valves, while it will be remembered that the Peugeots entered at Indianapolis last year had five valves per cylinder. Some engines designed for high speed work have three valves and in this case there are two intakes and one exhaust. Racing engines have a greater lift to the valves than stock engines.

An interesting valve layout conducive to high speeds is found in the Essex. This is called a super-imposed type, wherein the intake is placed directly over the exhaust valve. This makes it possible to use larger valves in each case and attain better volumetric efficiency.

Having obtained as many or as large valves per cylinder as possible the next step in a high speed engine is to see that these valves are properly timed. Every effort is made to take advantage of the inertia of the gases. When the piston is at the bottom of the intake stroke it is powerless to take in any more gas. This, however, is not the place to close the intake valve as might seem logical, because the gases themselves contain a large inertia force due to their high velocity. Hence the intake valves in high speed engines are closed considerably after bottom dead center has been reached. Naturally the opening and closing of the exhaust valve is just as important.

These are not by any means the only things with which the race engine designer concerns himself. There are such things as the weight of reciprocating parts. For instance, in one case 8 m.p.h. was added to a race car's speed by fitting valves with hollow stems. The tulip type valve shown in this article decreases weight.

Reduction of friction in the engine is another big item. Every bearing in a racing engine must be fitted with the utmost care. Ball bearings are generously used in race engines to reduce friction.




This is a horsepower and torque curve of the Essex stock engine

# Boston Predicts Deferred Deliveries

## *Volume of Sales at 19th Annual Show Causes Many Dealers to Prophesy a Shortage of Cars at Present Production Schedules*

The "Avenue de Luxe" at Boston's 19th Annual Automobile Show. An impressive cathedral effect was obtained with leaded glass windows and highly colored panelling. More money was spent to promote this year's show than ever before

BOSTON, MASS., March 21—At the 19th Annual Boston Automobile Show held in the Mechanics Building this week it was indicated that in all lines of the industry men were thinking about the fundamentals upon which intensified merchandising must rest. They are thinking about next year and ten years hence—charting a course.

The factory representatives were there with definite plans for assistance in merchandising their products. Distributors were dividing selling districts, concentrating sales effort. Dealers were analyzing territories, building vocational files, strengthening service facilities—and all with the one big idea—the putting of merchandising on a scientific, intensified, basis.

Boston, with other parts of the country, was thinking these things, and to some extent practicing them even before the great auditorium, with 105,000 sq. ft. of display space, was opened to the public last Saturday. Under the public reaction to their strong merchandising efforts the dealers—many of them—had been reaping the reward in steadily increasing sales. So it was not surprising to the show management when, on the opening day, they were requested by the Boston police to throw open the exposition fifteen minutes before schedule to relieve the congestion about the show building.

Of course, the open winter, early spring, reduced financial pressure, and other elements had entered into the situation to some extent—but above all the dealers knew that the intense public interest was due to the constructive sales effort that had been carried into the New England territory—partly through small shows—in the weeks just preceding the Boston opening.

### SALES MORE THAN 50 PER CENT OF 1920

So when the Boston show opened Boston dealers were actually selling. The volume was placed at more than 50 per cent of the abnormal 1920 volume. Estimates placed the stocked cars in the territory at 8,000, considered to be scarcely a month's supply under the existing selling impetus.

There were many dealers who predicted, if not actual shortage at least two to three weeks deferred deliveries in May and June under present factory production expectation.

Cars were selling all along the line, with the proportionate volume considerably greater in the price classes above $1,500. Trucks were selling, but slowly, the best results showing in organizations where sales effort was being applied strongly in vocational lines where spring and summer demand might be expected. Accessories and tires showed a marked increase during the past six weeks, but with the smaller dealers buying in smaller lots. Accessory prices were reported approximately 25 per cent lower than last year.

Used cars were showing surprisingly good sales, with prices holding up remarkably. The encouraging condition of this market was laid to the selling pressure exerted by new car dealers as a means of clearing the way for new car handling, and the capitalization of the spring shortage idea by the used car dealers. Inquiries at the booths where tractors and their accompanying farm implements were shown indicated a fairly good spring demand for these products, and there were some sales of Cletracts and tractors of that type to contractors and to some municipalities for road work.

### BEST SHOW BOSTON EVER HELD

The Boston show, as an exposition, is greater and grander than ever. To begin with there was greater promotion—more money was spent in advertising it throughout the district. The strands of tradition were snapped in many instances. The low hanging apple blossom decorations were discarded for a beautiful cathedral decorative effect in which huge artistic electric chandeliers, with vari-colored lights, leaded glass window effects and highly colored panelling predominated. Tradition did, however, designate the positions of most of the exhibits. Trucks and tractors were shown in the basement

On the whole, the individual exhibits were well arranged, with some indications of crowding, a condition difficult to prevent in a show where demands for exhibition space exceeded the spaces available by more than 200.

Several of the booths made striking displays. Buick, for instance, attracted large crowds with a sport model under a blue plush canopy and surrounded by a brass rail, which revolved slowly on a turntable hidden by a flower bed. A small negro boy in vivid red bell-boy suit sat at the wheel.

Lafayette showed a beautiful nickeled chassis that brought

out strongly the hound's tooth character of its engine and chassis construction. Pierce-Arrow showed a light green roadster with lobster red leather upholstery and disappearing top. Lexington's canary birds in artistic wicker cages warbled to the passing throngs. Paige had Ralph Mulford there with a car with a speed record and Velie showed a cut-away car that showed not only engine and chassis construction, but initiated observers in the mysteries of body construction, upholstery, paint and other developments of the finished product.

Coming so late in the season Boston, naturally boasted of few new products. Wills-Sainte Claire was there in a prominent space, and also on Boston's "Billion Dollar Row" in a beautiful big salesroom. Several new cars, however, made their first Boston bow, including Dixie Flyer, Dorris, DuPont, Gardner, Hanson, Kelsey and Handley-Knight.

In the truck section the newcomers included Facto and Ajax. The Facto model shown was a 2½ tonner with standard units. A merchandising plan embracing a factory to user arrangement was announced at the show.

Alfred Reeves, general manager of the N. A. C. C. and Harry Moock, general manager of the N. A. D. A. were the principal speakers at a big "Pep" meeting of New England territory dealers in Boston Tuesday night which was held under the auspices of the Boston Automobile Dealers' Association, sponsors of the show.

Under the same auspices the Boston Salon, in the Copley-Plaza Hotel, was opened Tuesday with a striking display of domestic and European quality jobs. The collection attracted large patronage and introduced in Boston the post-war Mercedes. Among the other cars shown were Rolls-Royce, Northway, Fiat, Kenworthy, Northway, Hudson, Marmon, Pierce-Arrow, Lafayette, Stutz, McFarlan, Daniels, Sunbeam, Lincoln, Packard, Cadillac, Apperson and Franklin. Many luxurious body jobs were shown, including several exhibits from the Portsmouth Auto Body Co., on Cadillac chassis.

View of the main aisle in Boston's exhibit showing the artistic booth markers and chandeliers

# *Record Attendance with Desire to Buy Features Opening of Detroit Show*

DETROIT, March 19—Unmistakable evidence of the industry's rapid stride toward normalcy was furnished by the throng that set a record for attendance at the Detroit automobile show opening here tonight. The interest manifested was an invigorating tonic for dealers that augurs well for the future merchandising efforts in Detroit. A get-together attitude quickly was apparent following the formal opening ceremony and the business of buying and selling was entered into with evident determination on both sides to take full advantage of the opportunity offered by the show.

Basing calculations on past performance, members of the Detroit Auto Dealers' Association, headed by President A. L. Zeckendorf and Manager H. H. Shuart, expected the usual throng of first nighters to be attracted in great measure by curiosity, and were agreeably surprised not only by the greatly increased attendance but the obvious desire of visitors to become owners. Exhibitors' representatives entered spiritedly into the selling contest with the result that orders booked last night also set a record Actual sales of 62 cars were reported by dealers.

The attitude of visitors readily demonstrated they were impelled by motives of self-interest rather than the desire merely to be entertained by the attractive displays of motor vehicles, the gorgeous decorations and the musical program. Cars were given minute inspection from radiator to spare tire carrier, and not a detail necessary to comfort and dependability was overlooked in the searching examination of prospective purchasers. While interest naturally centered in the automobile display, commercial vehicles came in for a goodly share.

Association officials had extended themselves in the effort to make this year's presentation set a mark for similar exhibitions. With more than 300 passenger cars, 20 types of trucks and commercial cars, and 40 accessory exhibits displayed artistically, amid a decorative setting enhanced by harmonious lighting effects, the scene was calculated to arouse enthusiasm. Decorations depicting the Pompeian era with streamers draped attractively, and the coloring of artificial flowers and pot plants blending with the dignified black limousines and broughams and the snappy shades of sport roadsters compelled admiring glances and appreciative comment. The opinion was expressed generally that the show from every standpoint was superior to either Chicago or New York. In fact, it was freely commented upon as the most elaborate automobile display ever presented, covering more than 3½ acres on one floor.

## STOCKS WILL SOON BE EXHAUSTED

With such an auspicious start, dealers look with confidence to the future. The week of record sales is believed certain to be followed by steady increase in spring and summer business, and the predictions of many manufacturers, that with the spring buying season in full swing, stocks in many instances quickly would be exhausted, seem destined of fulfillment. The keen interest manifested by manufacturing executives who were prominent in the opening crowd and their expressions of surprise at reports of their dealers, are certain to be reflected in renewed activity in the manufacturing end.

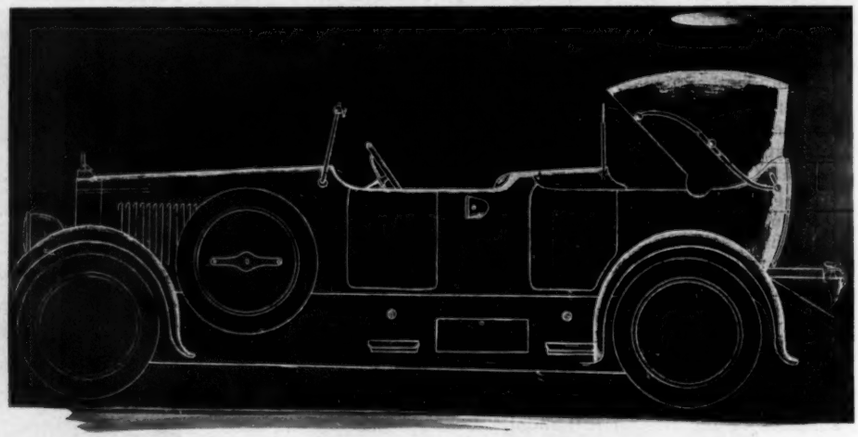
Detroit occupies a peculiar situation in the fact that conditions in other sections of the country affecting the manufacturer are reflected in the business of local dealers. A buying slump in the east, west or south that is followed by factory curtailment necessarily has a depressing effect on local business and conversely extraordinary buying in other sections, that brings renewed activity at the factory, has a tendency to create demand here. The psychological effect of the feeling of optimism aroused by the reports of a steady upward trend clearly is exemplified in the attitude of show visitors.

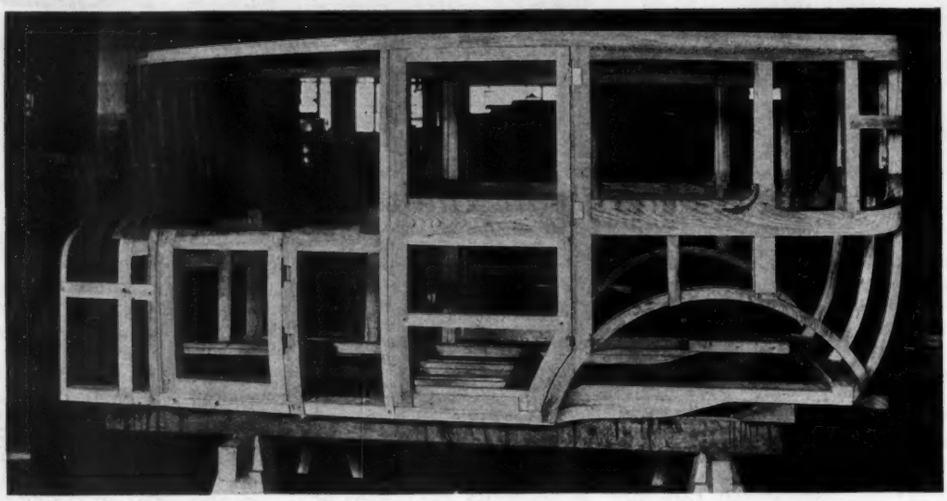
A striking indication of the earnestness with which dealers have entered into the selling campaign is shown in the fact that every city in Michigan and scores of the smaller towns and villages are well represented as are also many cities in northern Ohio and Indiana. Heretofore, the local distributers have confined themselves to informal gatherings of such dealers as were present during show week, but this year formal conferences have been scheduled by a half-dozen distributors with the result that every section of Michigan is represented by groups of dealers and their friends.

# It Takes Time and Money to Build a Body

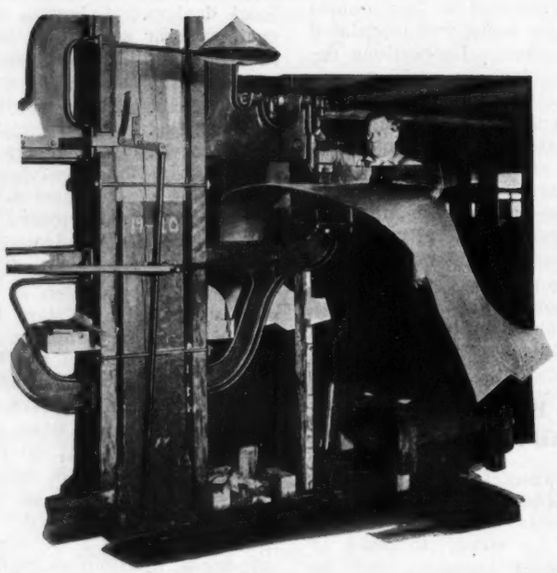
IT is a good thing now and then for everyone connected with the automotive industry to take a day off so to speak and get a real inside look at the product we are making and selling. The dealer, distributor and serviceman is probably confronted with a large number of questions every week from customers or prospects as to how a certain part of a car is made and why it is made this way or that way. It may be the engine, the axles or the body. It may be that many of the dealer's prospects wonder why a closed body costs so much more than the touring body, or why when a careless owner has backed into a telegraph pole and crushed in the rear panel of his car it means an outlay of quite a sum of money to iron out the wrinkles.

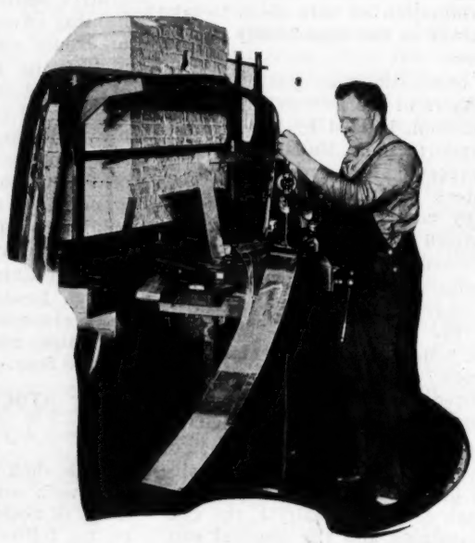
The paint and varnish on a car on the outside and the upholstery on the inside





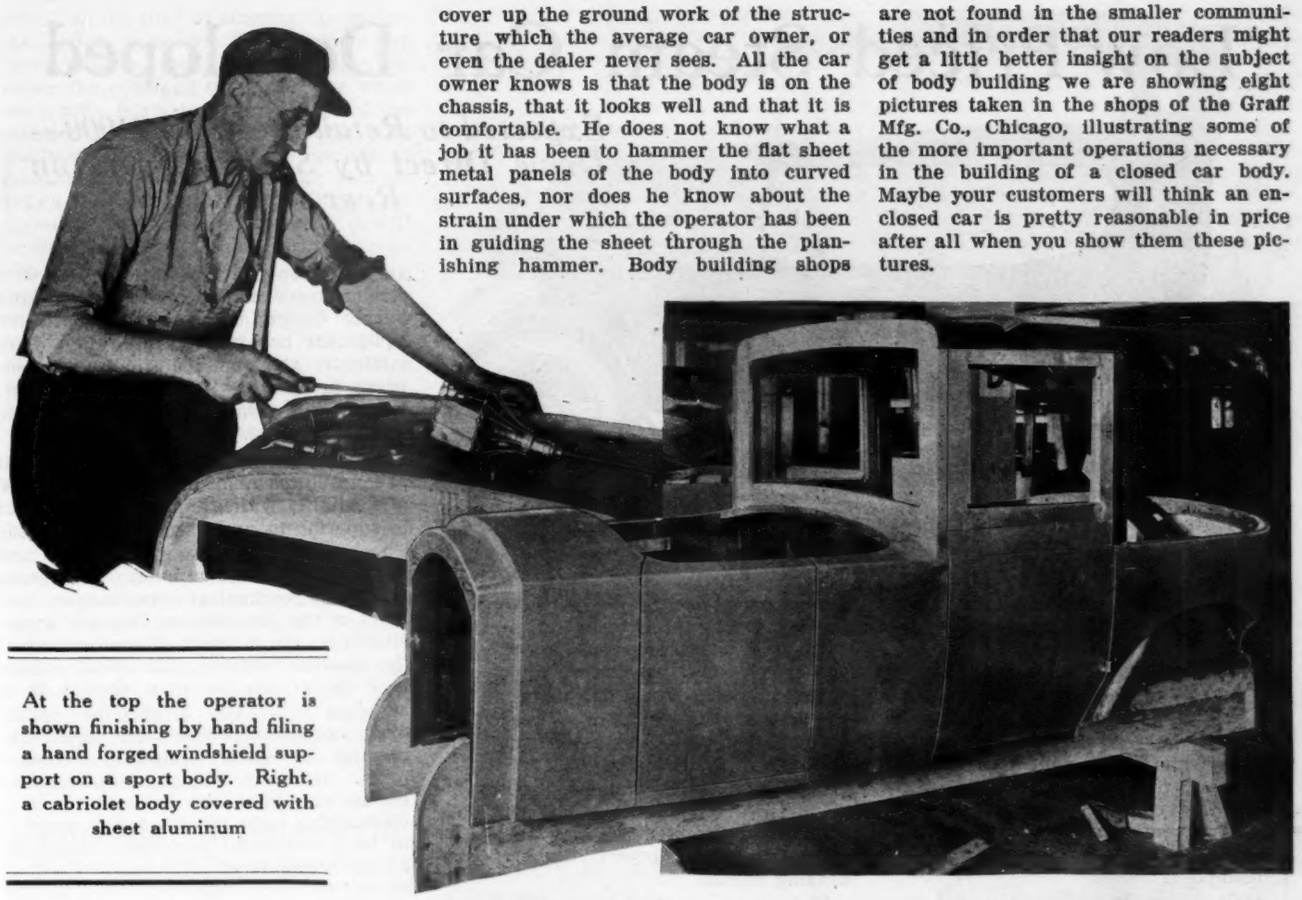
Above, full-size crayon sketch from which the body builder works. This body was designed for a Packard 3-35 chassis. Left, framework of an eight-passenger limousine body. This gives a good idea of the elaborate wood structure necessary to support the metal panels and insure rigidity to the body





At the left is shown one of the most important jobs in body building—forming the panels by the aid of a planishing hammer. This hammer strikes many blows a minute and needless to say it is quite a strain on the operator. At the right the operator is working on a recess belt for a town car. There are many of these small puttering jobs in body building

cover up the ground work of the structure which the average car owner, or even the dealer never sees. All the car owner knows is that the body is on the chassis, that it looks well and that it is comfortable. He does not know what a job it has been to hammer the flat sheet metal panels of the body into curved surfaces, nor does he know about the strain under which the operator has been in guiding the sheet through the planishing hammer. Body building shops are not found in the smaller communities and in order that our readers might get a little better insight on the subject of body building we are showing eight pictures taken in the shops of the Graff Mfg. Co., Chicago, illustrating some of the more important operations necessary in the building of a closed car body. Maybe your customers will think an enclosed car is pretty reasonable in price after all when you show them these pictures.



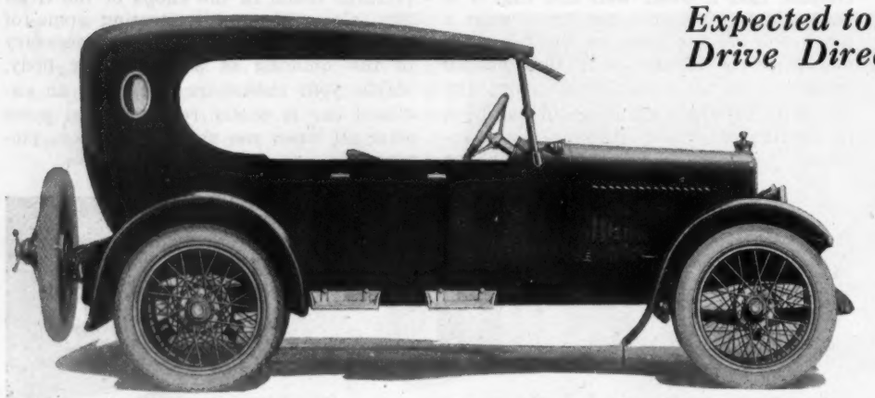
At the top the operator is shown finishing by hand filing a hand forged windshield support on a sport body. Right, a cabriolet body covered with sheet aluminum

Welding plays quite an important part in body building. Here the operator is shown welding the rear and side panels. After the weld is made the superfluous metal at the weld is smoothed off and when the body is finished it is impossible to detect the weld

Before a body can be painted and varnished it must be prepared by much laborious hand rubbing. The man in this picture is rubbing out a coat of "rough stuff," which is put on the metal after the priming coat

# Low-Priced Steam Car Developed

## *Expected to Retail at About $1000—Drive Direct by Six Cylinders on Rear Axle*



The new Coats steam car is a five passenger, six cylinder, 110-inch wheelbase job with electric lighting and starting. It will retail at about $1000

FROM Indianapolis comes an unusual announcement concerning a new steam motor car that will shortly go into production. The car is of small size having a wheelbase of 110 in. and is designed to sell at $1,000. In appearance the car resembles the modern internal combustion engine car, its lines resembling the conservative sport model type. The company planning to build this new creation of the industry is the Coats Co., Merchants Bank Building, Indianapolis.

Mechanically the car consists of a steam boiler located under the hood, a steam line supplying the engine and the engine located in the rear axle. The used steam is returned to the radiator-like condenser at the front. The boiler consists of a combination fire and water tube type. The tubes of the boiler are welded at the top and bottom to the water and steam drums. From the boiler, a steam line, insulated against heat leakage, conducts the steam to the rear axle. The steam line resembles a torque tube very much, and is fitted with a steam tight universal joint at the front end.

### Six Cylinders Used

The rear axle is a combination of an engine and axle. Six cylinders are used, three driving each rear wheel. From this construction it will be seen that the differential has been eliminated. The cylinders are set in the center of the rear axle and each group drives a single throw crankshaft which is part of and integral with the drive shaft for each wheel. The bore and stroke of the cylinders is 2¾ by 3 in., and the valve arrangement is very similar to a gas engine. The poppet valves operate from cams and differ only in their manner of timing.

In this engine each stroke toward the center of the engine for each cylinder is a power stroke, thus each cylinder has a complete cycle during one revolution of the rear wheels. In case the car is rounding a corner one of the three cylinder engines will turn slower than the other. Each cylinder exerts a power impulse for one-half of a wheel revolution, but there are three cylinders so there is distinct overlapping of power every 60 deg. of wheel movement.

The fuel that is used is kerosene and the claims of the inventor as regard the fuel consumption gives ranges of 20 to 40 miles per gallon.

One water filling of the tanks is sufficient for a mileage of 300 to 500 it is said, which is no more than should be expected from a properly designed condensing system.

The car is completely equipped with electrical fitments. No starting motor is used but initial vaporization is insured by an electrical heating coil at the fuel nozzle, which is controlled by a switch from the dash.

From the right side of the rear axle the power to drive the auxiliary apparatus is taken. The driving means is a shaft that is parallel with the torque tube and extends up the front end of the car to a small enclosed compartment under the hood. Here is located the water pump, the fuel pump, and the generator, this latter member being adjacent to the compartment.

The frame of the car is conventional but is lighter than in the ordinary gasoline car of like size. The front axle is conventional but is light in weight, and is mounted on semi-elliptic springs. The steering gear is conventionally arranged also. Wire wheel equipment is standard on the car.

### First Low Priced Steam Car

There has been much speculation on the possibilities of the steam car, and the automobile world was startled once by the announcement of a car which had many unusual features. That car was large and was comparatively high in price, but the Coats steam car is the first modernized steam car announced to suit the pocketbook of the small car buyer. Concerning the advantages and disadvantages of steam, there is much to be said. It was once the general belief that a steam motor car needed the services of a retired locomotive engineer to keep it in operative condition. But with strides made in water regulation and burner design, the manually controlled equipment has been reduced to a bare minimum and the operation now compares favorably with any gasoline car. From a fuel point of view the steam car offers vast possibilities.

The steam car uses no transmission and no clutch and still attains a degree of flexibility with its one gear ratio that is superior to any gasoline engined car The application of many cylinders and transmissions with a number of speeds are only mechanical construction features of the gasoline car that are necessitated by the inherent characteristics of the gasoline engine. The steam engine is a power exerter even though it is standing still, but a gasoline engine once stopped is worse than "dead" for it must be again started by external force. However, the modern gasoline engine car must not be held up in a disparaging light for its records prove it to be a wonderful performer regardless of its complexity.

## Booty Carbureter Redesigned

THE product of the Booty Carbureter Co. described in these columns about a year ago has, since that time, been completely redesigned in its mechanical form, but no change in the principle of carburetion has been made. Those who remember the former Booty instrument will recall that the carbureter was of the top outlet type but the new model is a side outlet instrument.

The distinguishing feature of the Booty carbureter is its unique proportioning valve. A floating piston is used which rides in the air column in such a way that a constant vacuum is maintained within the carbureter. The upper end of the piston operates in a chamber seated at one end forming in effect a dash pot which eliminates all tendency to flutter and at the same time dampens its movements sufficiently to maintain the mixture when acceleration takes place. The metering pin is attached to the piston and slides in the fuel distributing nozzle. It is cylindrical in shape and is provided with six tapered grooves cut longitudinally from zero at the top to a maximum depth at the bottom. As the piston is raised the metering pin is withdrawn from the fuel well and, consequently, the area of the fuel exit is enlarged in proportion to the lift of the piston.

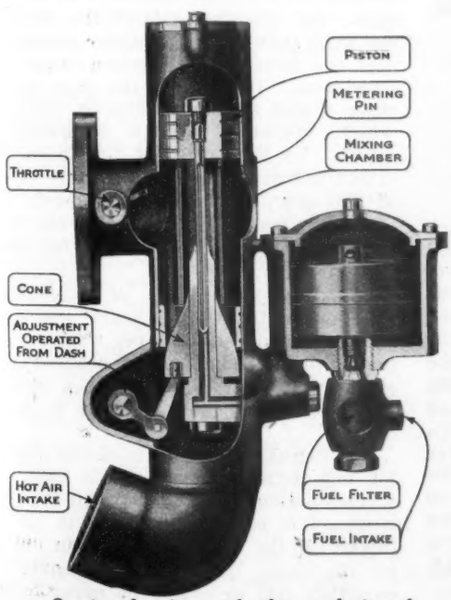
The quantity of air admitted is also measured, and is proportioned to the fuel by the relative area of opening between the bottom of the floating piston and the

cone. At the time of starting the engine the piston is naturally resting in its lower position, with no area existing between the cone and the piston, but when the engine is started, the vacuum of the manifold causes the piston to raise, thus admitting the air through the opening so created. At the same time the vacuum draws the fuel from the openings produced by the grooves in the pin. It will be seen that there is no fuel valve to be adjusted and, in fact, there is no adjustment on the whole carbureter. The only variable factor within control of the operator is the raising and lowering of the cone which is accomplished with a dash control, ordinarily termed a choke, but not correctly applied in this case.

On some tests that have been conducted with the Booty carbureter very gratifying results have been obtained, and this is especially so on the Ford model.

The float chamber is rather unusual in that the float valve is an underseated valve operating without the aid of lever arms to push the valve closed. The float merely raises the valve and so shuts off the fuel, thus keeping the level constant.

The Booty carbureter is made in a number of different sizes with a special model for the Ford. It is made by the Booty Carbureter Mfg. Co., 554 W. Harrison Street, Chicago.




Sectional view of the redesigned Booty carbureter

## Designing Vs. Simplifying

So much is written nowadays about standardizing of parts that one almost comes to think that such a thing is really possible and that before long we will float along the road in a really standard and standardized car. Wouldn't that be "grand and glorious?" In the meantime what about simplifying first and standardizing later?

The writer became acquainted with the automobile fourteen years ago and has owned, driven and repaired cars ever since, but as far as simplicity is concerned, the word has been relegated to the dim and uncertain past.

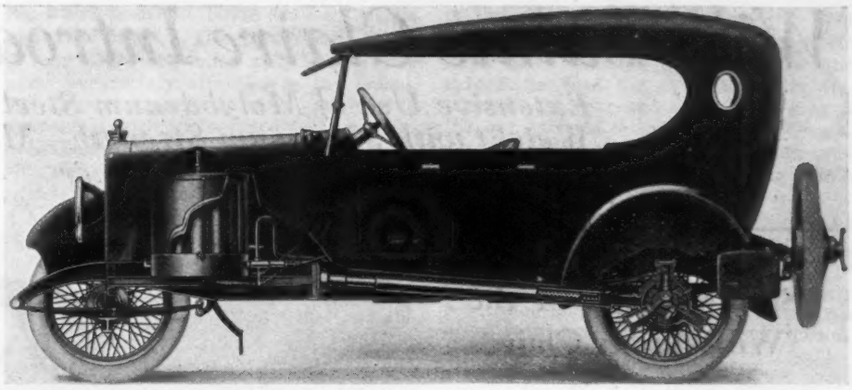
I have compared notes with scores of mechanics in knocking around and find that they are all agreed that if the designers were compelled to get out in the field and do the work that we are called upon to do on their pet creations, there would be some radical changes in the new models coming out.

Policy forbids us from giving the names of the various cars we have come in contact with and which have been "blessed" in no uncertain terms. It's true that one must remember that the motor car is a very much condensed power plant and that it is called upon to do almost impossible things, but there are many simple little changes in construction that could be made which would help the repairman and reduce the cost of upkeep for the owner.

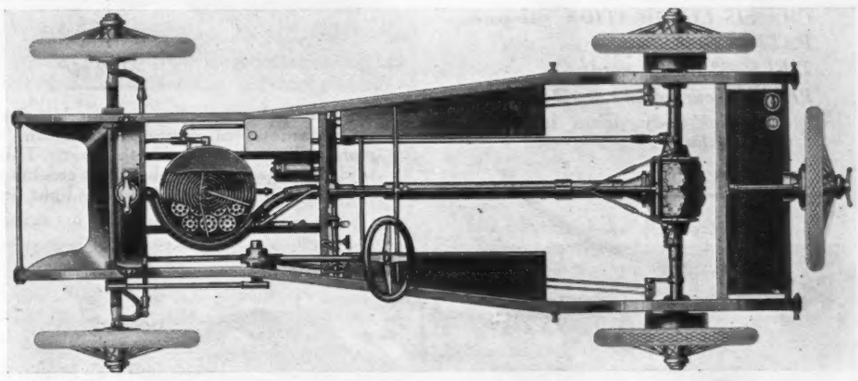
We know of several engines that have accessible main bearings. We also know of a number that do not have such bearings. Why? We know of engines with fan belts which can be put on with speed and reasonable comfort. We also know of two very popular cars on which it is necessary to take off the radiator before this can be done. Why? We know of engines on which it is possible to adjust all the main bearings with ease. Others have to be hoisted up on a jack to make the front bearing accessible and still others are hid away as though the men desiging them were in great fear lest the poor abused bearings be found. Why? Tappet adjustment is another thing. Why pile up a lot of parts in front of the cover plates so that the mechanic has to skin his hands and curse everything in sight and hearing to make this important adjustment?

Why place spring bolts in such a way that one is forced to loosen running boards and use a crowbar to pry things out and into a sprung condition, just to put into a new spring?

Lists a yard long could be made of the many places on a car that could be improved and made more accessible and would save the owners countless dollars.—Wm. G. Jarrett, Platteville, Wis.



Cut away view of Coats steam car showing boiler, steam line and three cylinders of the six-cylinder engine on rear axle. There are three fixed cylinders for the drive shaft of each wheel. Connecting rods are pivoted to crank pin integral with each shaft. This gives the Coats direct power application. It also includes the differential function. The cylinders are not in the wheels as the photograph seems to indicate but are on the axle where the differential usually is



Plan view of the Coats steam car. Note that the engine in its housing on rear axle is no larger than the ordinary rear axle gear case

### CUT IN SAMSON TRACTOR PRICE

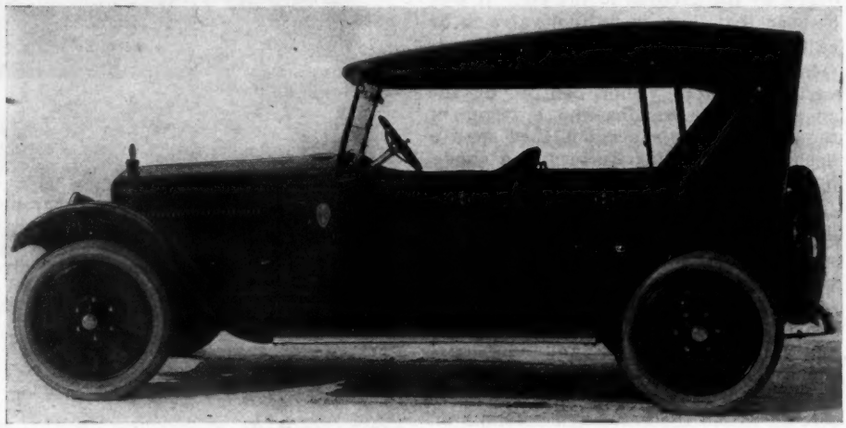
Janesville, Wis., March 19—J. A. Craig, president of the Samson Tractor Co., a subsidiary of the General Motors Corp., has announced a 20 per cent reduction in the price of tractors and a 10 per cent cut in the price of power harrows and plows.

# Wills-Sainte Claire Introduces Features

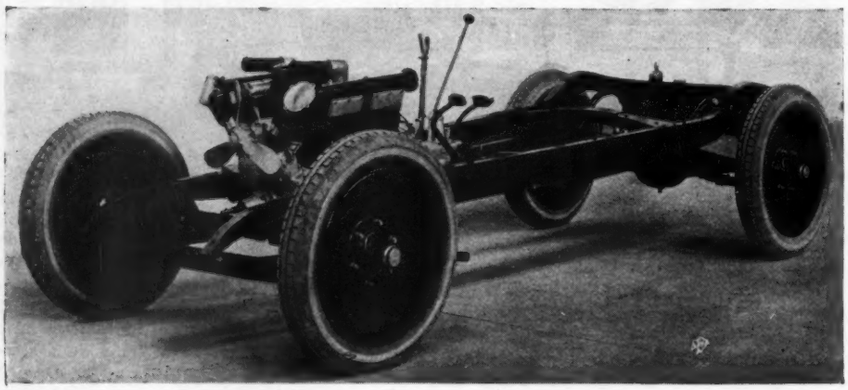
## *Extensive Use of Molybdenum Steel Gives Light Weight with Maximum Strength—Many Conveniences for Owner*

### Specifications of the Wills-Sainte Claire

*ENGINE—8 cylinders, 3¼ by 4 in.*
*COOLING—Thermosyphon.*
*STARTING, lighting and ignition—Delco.*
*CARBURETER—Zenith.*
*CLUTCH—Dry disk.*
*WHEELBASE—121 in.*
*CHASSIS LUBRICATION—Alemite.*
*BATTERY—Willard.*
*TIRES—32 by 4½ cord.*
*PRICE—Touring and Roadster, $3500 (Enclosed body prices to be announced later).*



The five-passenger touring model of the Wills-Sainte Claire bears a resemblance to a famous European production, the Hispane-Suiza. Disk steel wheels are standard equipment on this car. This wheel is made by the company and it is said that because molybdenum steel is used in their construction they may be made very light and still very strong



The chassis of the Wills-Sainte Claire discloses a very finely designed foundation. Every part of the frame is of molybdenum steel, an alloy steel that is very strong. The light weight parts appear unusually slender but their strength is maximum because of the use of this steel. It will be seen from a close inspection of this illustration that there is placed over each cylinder block a tubular portion running the entire length of the block. These are the overhead camshafts and this is the first eight cylinder car to use overhead valves driven from an overhead camshaft

THE new Wills-Sainte Claire, manufactured by C. H. Wills & Co., Marysville, Mich., present a great number of features that give it a "Different" appearance and to give to the owner many new conveniences, some of which have not been seen on any other car. These, in addition to the excellent mechanical features will undoubtedly be of great assistance to the dealer.

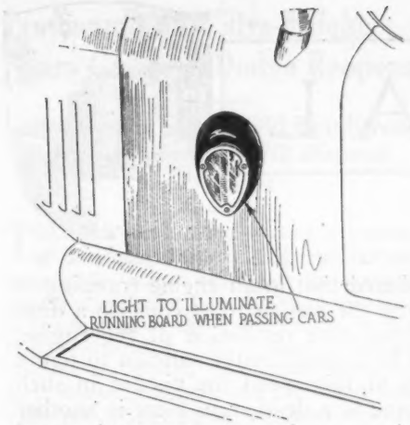
One of the points on which the greatest stress is laid is the extensive use of molybdenum steel throughout the car and it is stated that this is the first car in which the use of this material is carried out on such an extended scale.

The engine has many novelties. It has eight cylinders, in two blocks of four, these being at an angle of 60 deg. to each other. The cylinder flanges are cast well up on the cylinders due to the design of the valve mechanism, thus allowing the block arrangement to be very compact. The valves are in a straight line in the head and are operated directly by the camshaft and cams which run over the head and are completely enclosed and lubricated by a drilled oil channel. This is the only car on the market so far with this type of valve mechanism. The camshaft is braked by a 30-lb. spring up to a speed of 360 r.p.m. and when the shaft reaches this speed, the brake is automatically taken off and the shaft runs free.

The mechanism driving the camshafts, fan and motor-generator is quite off the beaten path of design and of course, due to the new design of the overhead camshaft, many new mechanical contrivances have had to be introduced. The crankshaft drives the half time gear which is directly above it, and integral with this gear is a spiral bevel gear which drives the two inclined shafts, which, through another set of spiral bevel gears, drive the camshaft. These gears and shafts are all fully enclosed, but have inspection plates so that they can be quite easily gotten at. The half time gear also has an extension to the rear to which is attached a flexible steel ring universal joint. On the other side of the joint is the shaft that drives the motor generator and the distributer is driven from the same gear. In front of the gear is the three bladed aluminum torpedo type fan which operates through a governor clutch. Up to a speed of 270 r.p.m., the clutch drives the fan at the same speed as the gear, but above this speed, the clutch throws out, and while the fan does not stop revolving, yet it does not take any power to run it.

As a further means of decreasing gear noise, the timing gears are split and have composition paper washers between the sections. This deadens the ring of the gears so that when struck with a hammer, they sound as if made of lead.

The Zenith carbureter is of the double jet, non-adjustable type and is hung on a combination manifold between the two blocks, this manifold acting both as an intake for the mixture and as an outlet for the water, there being an extension on either side to which the upper hoses are clamped. Two stay rods extend from




The "courtesy" lamp in the left side of the body

these extensions to the radiator, these being underneath the hoses and doing away with the customary single rod extending from the dash to the upper radiator tank over the center of the engine.

The cylinder blocks are of cast iron with 3 per cent nickel and with walls only 3/16 in. thick. The valve guides are of steel and are held in the cylinder heads with a press fit. The lower end of each cylinder is beveled to permit insertion of piston rings without special tools. The crankshaft is machined all over, is of the three bearing type and has bearings of generous size. Lubrication to the connecting rods is from the main bearings. The oil is pumped to the top of each of the main bearings and is picked up by a little scoop formed in the shaft, being thrown from this point by centrifugal force to the connecting rod bearings through holes drilled through the shaft. Each main bearing takes care of two rod bearings. Both main and rod bearings are bronze backed babbitt lined. The rods are also finished all over and rods and pistons are assembled selectively by weight, the piston weighing 1 lb. 3 oz. Pistons are cast iron with highly polished tops, have two rings above the pin and one below. The wall is relieved around the pins.

### Many Driver Conveniences

The oil is carried in the conventional sump which has, however, a bronze screen all over it. There is a pressure regulator on the right side at the bottom of the crankcase and this can be regulated from the outside and requires only the lifting of the hood and a slight turn with a wrench. As an additional safeguard in case the oil gage becomes inoperative, there is a metal rod which dips down in the oil reservoir and by withdrawing, level of oil can be seen.

The gasoline is carried in a tank at the rear, this being provided with a gage and a reserve tank operated by a lever on top of the tank. Fuel feed to the carbureter is by vacuum system, the vacuum tank being attached to the front of the dash. There are two individual exhaust systems each with its pipe, muffler and tail pipe, one for each block.

The radiator is of ample size to take care of the thermosyphon system of cooling which is used. There are two outlets and two inlets. The powerplant itself is four point suspended and the two rear arms are rigidly attached to the frame. The front supports, however, are spring suspended with a combined leaf and coil arrangement. A bolt passes through the side member of the frame and the engine arm. Between the arm and the frame is a broad curved leaf spring and between the frame and the nut on the bolt is a strong coil spring. This keeps the engine arm tight against the leaf under normal conditions, but allows it to lift if the frame weaves.

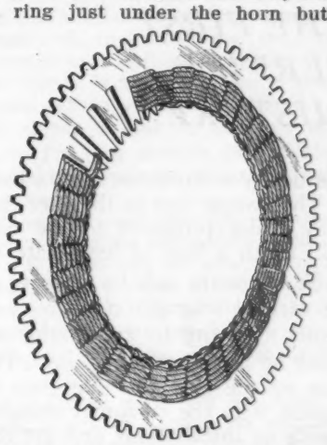
The clutch is of the dry disk type. The driving disks are polished steel and the driven disks are slotted with Raybestos woven through the slots much like basket work. The ends of the slots are then bent over to hold the weave in place.

The gearset is of the selective sliding type with three forward speeds. The rear axle is of the semi-floating type and the ratio is 4.4:1. The brakes are of the external and internal type, Raybestos lined and provided with equalizers. Springs are half elliptic, front and rear.

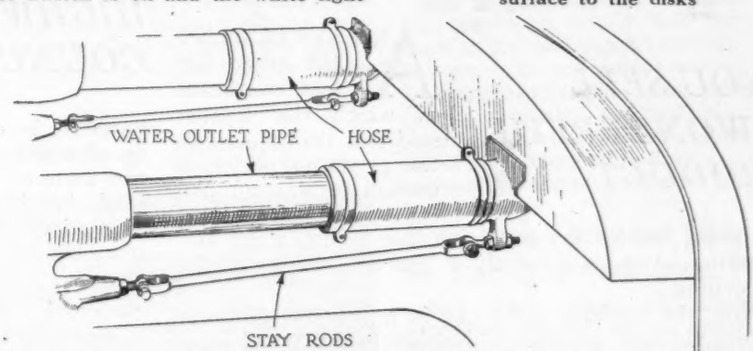
Ball bearings are used in the axle, wheels, gearset and other points.

Many conveniences for the driver and passengers have been introduced, the most striking of which is the "Courtesy" lamp on the left side of the body just ahead of the front door. This lamp, with an odd shaped reflector, may be used to light up the runningboard or to illuminate the features of pedestrians on the road at night. The tail lamp has a double lens, one red and one white. The red light shows at all times when the proper switch is on and the white light is lighted automatically when the gear lever is placed in reverse. This white light gives enough light to show the driver the road for a considerable distance to the rear and also to the side of the car. There is another lamp permanently fixed to the front of the dash over the engine and this lights up the whole power plant.

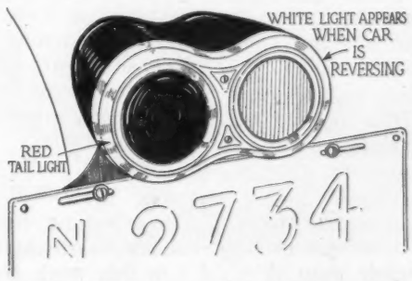
The headlamps, instead of being fitted with two sets of bulbs, have tilting reflectors which oscillate through an arc of 5 deg. The movement is magnetically controlled and the operation is by means of a ring just under the horn button.

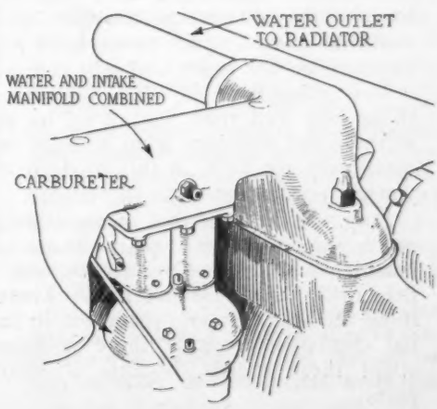


The clutch disks of the Wills-Sainte Claire are threaded with a durable cord as shown in the sketch above. When the plates come together the flat of the opposing disk is caused to strike the cords which at first are round and then as the pressure grows greater, become elliptical and thus present a greater and greater surface to the disks




The water hose connections are provided with stay rods to relieve the hose connections of any mechanical strains




The taillight is provided with a white light to light the garage or light any dark place backing up. Right—A double Zenith carbureter is used and the manifold connections are hot water heated

# EDITORIAL

## THE FIRST SERVICE MISTAKE

THE first great mistake in service is made very often when the dealer sells a new car to a new customer. Especially is it dangerous when the customer is a friend of the dealer or someone else in the organization.

The danger lies in the fact that the dealer or his men may make promises to the customer that if fulfilled will mean a loss of legitimate profit.

So, after the sale to the new customer has been made, be careful where you draw the line on what that customer is going to get in the way of free service and what he is going to pay for. If your system of inspection on the new car that goes out is right, there is no reason why the customer should come back for adjustments or installations and get them free of charge. Of course, if the proposition shows that the dealer's establishment was at fault, the customer is entitled to proper adjustment.

But, look out for the first mistake of service. Get the customer in the habit of paying for his service at the start and he will understand you and you will get the legitimate profits that are yours.

## YOU SELL A WONDERFUL PRODUCT

A STATEMENT the other day was overheard in which the speaker said that the automobile was as yet not perfected enough to warrant him buying one. This man was going under the assumption that buying a car and operating it was still largely a "get out and get under proposition."

True, the modern motor car is not a 100 per cent perfect piece of machinery. Neither is a railroad locomotive, a steamship, a watch or an electric motor, all of which have been with us many more years than the automobile. However, we have bought and operated locomotives, steamships, watches and motors and will continue to do so just as we have bought and operated automobiles for years and will continue to do so.

But, going back to what this man said, it is a good thing now and then for all of us to draw up by the wayside and consider what a really remarkable piece of machinery we have in this modern automobile, even if you go no further than the engine.

Stop and consider that in some instances engines have run as high as 4,000 r.p.m. There are other pieces of machinery that have rotative speeds higher than this, principally in the electric field. There may not be anything remarkable about them, but in the case of an internal combustion engine there is something remarkable about these speeds, because it involves reciprocating parts.

It must be remembered that in an engine traveling at the rate of 4,000 r.p.m. the pistons must come to a dead stop at top and bottom each revolution of the engine. You do not have to be a great mathematician to figure out how many times at this speed the pistons in such an engine have to come to a dead stop. Here is another thing: The pistons in an engine running at this speed assume a velocity of about a mile-a-minute within the short distance of one inch and then have to slow down again to a dead stop, whereupon they travel upward again to repeat the performance. This is but one of the instances to show some of the remarkable achievements of our engineers. It is a great achievement to have been able to compound materials and to correlate them in designs and construction to withstand the terrific punishment resulting from high speeds.

This is only the margin. When you add to this the ignition, starting and lighting systems, the gearset, axles, tires and hosts of other things we feel sure you agree with us that the modern motor car is a wonderful product.

## FEDERAL HIGHWAY COUNCIL

THE words Federal Highway Council, too little known and less understood by the majority of motor car dealers, have earned a place in highway transportation in the last few years. This organization, made up of members from all industries who merchandise as raw material or finished products passes over the highways, has in the last year been attacking some of the most vital problems in connection with highway construction and use.

Many months ago the Federal Highway Council instituted a research into the foundation of highways to ascertain why certain improved roadways go to pieces even when the surfacing of concrete or other materials has been properly constructed. This organization through its committee of highway engineers soon discovered that water in the sub-base of a road is a great destroying factor. In the cold seasons this water in the sub-base freezes causing the earth to heave and expand and this alternate heaving and expanding followed by thawing and consequent contract in the spring destroys the hard surface. The trouble does not lie with the surfacing of the road but with the foundation that may be four or even six feet below the surface.

In wrestling with this problem the engineers of the Federal Highway Council, all of whom give their service in this work free, have endeavored to work to keep the water away from the sub-base of the road. Chemical experiments are being carried out to see if it is not possible to waterproof soils just as we waterproof materials for raincoats. This is but one of the many activities of the Federal Highway Council.

## Production of Willys-Knight Cars Greater; Dodge Reopens

### Latter Begins Taking Old Employees Back—Production Will Depend on Demand

TOLEDO, March 20—With the return of Overland officials from the Boston automobile show yesterday indications appeared to point to a gradual increase in production at the Toledo plant of the Willys - Overland Co. Vice - President Charles B. Wilson and Sales Manager A. C. Barber attended the show and met with the Willys New England dealers while there. It was the first opportunity the dealers have had to get acquainted with the new factory heads and also put the factory men in touch with the Eastern markets. The officials expressed themselves as pleased with the results of the show.

On Thursday the first issue of the Willys News, the factory employees' paper, since the change in management and since the "closed for inventory" period last November was put out, betokening the gradual increase in business in the plant here. Employees are being added to the payroll and the production of Willys-Knight cars is increasing. The plant schedule is now running between twenty-five and forty cars daily. The output varies with the demands from dealers. A schedule for Overland Fours may be announced in the near future.

Detroit, March 18—Dodge Brothers began taking old employees back yesterday and officials expect to have 4000 of the 22,000 normally employed at work Monday. Company officials have selected the men who are to be reemployed and began notifying them to return Thursday night, with the idea of resuming production gradually and increasing the force and the production schedule in conformity with sales requirements.

Arthur T. Waterfall, general manager, said the company would make no statement regarding the actual number of men to be employed at the start, nor the possible production, though it is the hope of officials to increase steadily until production reaches one-third normal. This would mean an output of between 175 and 200 cars daily.

The report that the company would put on a night shift was denied by officials, who declared they were just "feeling their way" and future activities would depend entirely on demand.

### SERVICE MANAGER NOW DEALER

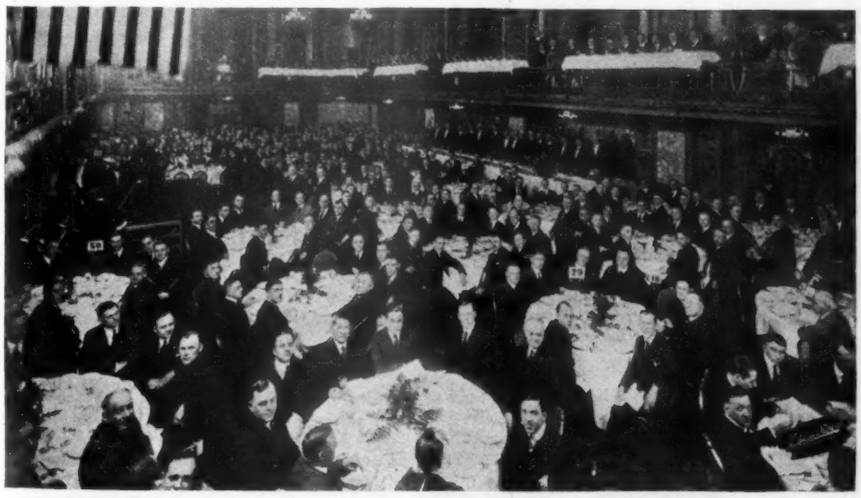
Bethlehem, Pa., March 18—The Hatch Motors Co., Philadelphia, has opened a sales and service branch here under the management of F. L. Berger, who has been the Philadelphia service manager. The owners of Marmon cars in Lehigh, Northampton and Schuylkill counties, as well as dealers in that territory, will now have shop and stock accommodations.

### AVIATION SERVICE IN MEXICO

Tampico, Mexico, March 18—The Eastern Mexican Aviation Co. has been formed here under the management of R. H. Maloney and will operate plans in and around this city and between Tampico and the city of Mexico, San Luis, Monterey, Vera Cruz, Tuxpam, Matamoros and other cities.

It is stated by Harry J. Lawson of the Nebraska Aircraft Corp. who is in Tampico, that the new company has placed an order with his corporation for 16 airplanes.

## *When Chicago Held Its Annual Meeting*



So many members of the Chicago Automobile Trade Association wanted to attend the annual meeting and banquet of the association that it was found necessary to place additional tables in the balcony of the Gold room of the Congress hotel to take care of them all. While the dinner was being served, dancers, magicians, etc., looked after the entertainment on a stage at one side of the room and when it was ended there was a round of speechmaking on association work and the industry in general

## Banker Advances Arguments For Dealers to Obtain Loans

### No Other Stocks So Liquid—Cases of Loss to Financiers Have Been Rare

NEW YORK, March 17—Henry Bizallion, president of the Gotham National Bank, told Reo dealers of the New York territory in convention here today that they could use two arguments to convince their bankers that their businesses were entitled to loans:

1—There is no other class of merchants whose stock is so liquid.

2—Cases of loss by bankers who have financed dealers in stocking cars are so rare as to attract wide attention.

The banker said that his wide experience in handling automobile paper had shown that the average dealer's loan on any particular car was usually liquidated in two months in this territory. He said a bank could more safely loan on cars as security up to 90 per cent of their value than on stocks.

Mr. Bizallion said that his bank advanced money to dealers on mortgages or bills of sale covering cars at the legal rate of 6 per cent plus a charge for drawing up the necessary documents, which never exceeded two dollars.

The banker said that in the long experience of his institution with automobile financing it had never lost a dollar except in one case of fraud, which he said might happen in any business.

A. G. Welch, assistant manager of the Reo Motor Car Co. of New York, presided at the convention luncheon. R. C. Rueschaw, general sales manager of the Reo company, talked along sales lines and congratulated the dealers on their part of the work, which he said had enabled the factory to operate at full tilt without warehousing cars or trucks.

## New York Company Gets Most of Tire Shipment from France

New York, March 18—Through information released by the under secretary for liquidation of stocks of the French government, it is learned that all but 12,800 tires of the 350,000 A. E. F. surplus has been bought by the Keystone Tire & Rubber Co., this city. Information was declined at the company's offices here as to the number which have been already returned to the United States.

Of the total of 337,200 tires bought by the Keystone company, about 200,000 are pneumatics and 150,000 solids. They are all of standard makes, and the pneumatics for the most part are said to be odd sizes. Information on the number of tires involved in the sale was obtained by the Rubber Association from the American ambassador in Paris.

It is understood that no excise tax was imposed on these tires at the time of sale to the war department and that action will be taken to assess this when the tires are offered for general sale.

## Show Starting Point for New Business in Salt Lake City

### Purpose to Demonstrate Utility and Necessity of Motor Car and Get Prospect List

SALT LAKE CITY, March 17—While there were some sales actually closed in many of the booths at the fourteenth annual Salt Lake automobile show, given under the auspices of the Intermountain Automotive Trade Association, none of the exhibitors would predict any sales two weeks before the show opened. The trade felt that if they could demonstrate the utility and necessity of the passenger car and create a large list of prospects their entire wishes would be fulfilled. The show had not been running more than two days before actual sales began to make their appearance, and from that time it became evident that the show would be the starting point for new business this year.

A definite check on the attendance records showed an increase of 20 per cent over that of 1920, indicating that the passenger car has lost none of its attractiveness, nor has the desire to own one been diminished during the strike against retail purchases. The visitors showed an intelligent interest in the cars displayed, making a careful comparison of the various models.

## Chicago Trade Association Elects Hay New President

Chicago, March 18—Thomas J. Hay, pioneer automobile dealer of this city and one of the earliest presidents of the Chicago Automobile Trade Association, was elected president of the association at the annual meeting here this week. John Nicol was chosen vice-president, R. C. Cook, secretary and W. J. Boone, treasurer. The directors are Leo A. Peil, James Levy and Ward S. Perry who are hold-overs and Jay A. Colvin and E. J. Kilborn, elected for two years.

A dinner at the Congress hotel was held in conjunction with the annual meeting, Mr. Peil, outgoing president, acting as toastmaster. A resume of the work of the association for the past year was made by him. Mr. Hay spoke on "The Association." Other speakers were John W. O'Leary, vice-president of the Chicago Trust Co., who told of "Conditions Confronting Us Today" and Mayor William Hale Thompson who discussed the "Pageant of Progress" which will be held on the Municipal Pier here from July 30 to Aug. 14 and for which a number of automobile manufacturers have taken space.

There was also an interesting vaudeville program in connection with the dinner.

### SHOWING USED CARS IN ST PAUL

St. Paul, March 18—The Automobile Dealers Used Car Clearing House, incorporated at $25,000, will put on a continuous renewed car show. The purpose of the corporation is to enable prospective customers of the used car houses to see a large line of cars in one place and of different makes and prices on the same principle that the regular national show gives the best opportunity for looking over new cars. The officers of the corporation are: President, L. C. Boller; vice presidents, W. T. Haynes and Einar Lee; secretary-treasurer, E. E. Rockhill; manager, H. D. Fenton.

## Dorris Plans Holding Company to Permit Greater Car Output

St. Louis, March 18—At a special meeting called for this month stockholders of the Dorris Motor Car Co. will consider the proposition of forming a holding company to purchase all the property and improvements owned by the company, in this way permitting further manufacturing expansion by turning the fixed assets of the company into liquid assets.

The company, according to its secretary, J. F. Culver, has been unable to expand and increase its output of cars to supply the demand on account of the lack of liquid capital. It has had too much of its capital tied up in real estate, he says. Through the organization of a holding company for the real estate the parent company would be given several hundred thousand dollars in liquid capital for manufacturing purposes. In the proposed transaction the parent company would take a lease on the property from the holding company.

The proposed holding company would be capitalized for at least $250,000. The value of the property owned by the company is between $350,000 and $500,000.

### NEW CANADIAN FINANCING FIRM

Ottawa, Ont., March 10—The Canadian Securities Corp., specializing in automobile financing, has been formed with a capital of $1,250,000 divided into $500,000 in 8 per cent cumulative preferred shares and $750,000 of common shares, both of the par value of $10. The new company will act in connection with the Confederative Investment Corp., Ltd., the latter being fiscal agents for the new company. The Ritter Commercial Trust of Cleveland has guaranteed the preferred dividend for ten years and undertaken to direct the management for the same period and at the end of the period to repurchase any preferred stock that may be offered at par.

### SAFE ROADS WEEK PLANNED

Boston, March 18—The Safe Roads Federation of Massachusetts has asked the mayors of the state to unite with it in a general observance of April 3-9 as Safe Roads Week. Frank A. Goodwin, chairman of the State Council, in a letter to them, calls attention to the fact that in April of last year the list of persons injured fatally and otherwise in motor vehicle accidents jumped from 554 for the previous year to 1,925, making that the worst spring month on record.

## Seventeen Associations at Illinois Convention

### State Organization Attracts Delegates at Second Annual Meeting—Show at Same Time

PEORIA, ILL., March 21—Representatives of seventeen affiliated automotive trade organizations in the state are attending the second annual convention of the Illinois Automotive Trade Association which opened in this city at 10 o'clock this morning and will continue over tomorrow. During the same week the Peoria annual automobile show is being held.

The convention is being held in the Gold Room at the Jefferson Hotel. The following is the program:

Monday

10:00 a. m. Call to Order.
Address of Welcome by Willis Evans, secretary of the Peoria Association of Commerce.
Response to Address of Welcome by C. A. Porter, president of the Peoria Automobile and Accessories Association.
Address of President by H. B. Pinkerton, president of the Pinkerton Motor Co., Peoria.
Report of secretary-manager by F. C. Zillman, Peoria.
Address, "Good Roads," by F. E. Erstman, Chicago, secretary of the Illinois State Automobile Association.
Appointment of Nominating Committee.

12:15 noon Luncheon.

2:00 p. m. Address by L. A. Peil, president of the Mitchell Automobile Co. of Chicago and former president of the Chicago Automobile Trade Association.
Address by Harry G. Moock, general manager of the National Automobile Dealers Association, St. Louis.
Report of Nominating Committee
Election of Officers
Adjournment.

6:30 p. m. Dinner and Entertainment

Tuesday

10:00 a. m. Call to Order
Forum
1. Passenger Car Division
2. Commercial Car Division
3. Accessories Division
4. Tire Division

Each day and night of the Peoria show will be a special one. Today is "Opening and State Association Day"; tomorrow will be "Visiting Delegates Day"; Wednesday, "Peoria and Good Roads Day"; Thursday, "Society and Club Night"; Friday, "Ship-By-Truck Day"; Saturday, "Farmers' and Truck Gardeners' Day."

## Hoped to Make Further Price Cuts; Makers Unable to Now

### Expected That Cost of Materials Would Be Reduced; Steel Is Still High

DETROIT, March 18. — Persistent rumors of price cuts apparently are without foundation and factory executives, denying the reports, in some instances again charge the stories are started and nourished by forces antagonistic to the automotive industry. Financial interests naturally come in for the great amount of censure manufacturers taking the position stock manipulators are responsible.

That the Ford price cut proved the greatest setback the industry has had to encounter is admitted and the diastrous effect on the public mind of announcements of reductions just now, with the business coming back to normal with a steady stride, is pointed to as precluding such eventuality no matter what the attitude of manufacturers may be.

It also is pointed out that automobile factories are not out of the woods insofar as high priced inventories are concerned. A great majority still are manufacturing from materials all of which were purchased at prices prevailing a year ago. Then too the very fact that what reductions have been announced from the material end figures in a small way in the cost of production it is said makes further reductions in car prices impossible.

**Steel Biggest Factor**

Manufacturers do not hesitate to say that until steel prices take a decided drop there will be not the slightest chance of cuts in car prices. Steel constitutes the big proportion in car cost accounting and even with reduced prices in wood, leather, upholstery and parts their cost in car construction is as nothing compared to steel. Some manufacturers admit they curtailed production during the latter months of 1920 with the idea in view of cutting prices after the first of the year at which time they hoped material prices would have been so reduced as to permit such movement. They were disappointed however and have resumed production with no idea of a price cut for many months if at all.

## New Manager for Goodyear Western Division Chosen

Akron, March 18—Robert S. Wilson, manager of the truck tire department of the Goodyear Tire & Rubber Co. of this city, has been appointed manager of the western division for the Goodyear company, with headquarters in Chicago, it is announced by Goodyear officials. Mr. Wilson will leave for Chicago the latter part of this month. The western division is one of four zones into which the United States are divided for distribution of Goodyear product. It comprises ten full states and sections of two others.

Mr. Wilson, a former Pittsburgh man and Princeton graduate, joined Goodyear in 1912. His first work was checking invoices. In 1913 he was sent to Detroit as an adjuster and the following year returned to Akron to become manager of the service department. In 1917 he became manager of the solid truck tire department, and with advent of the pneumatic tire for motor trucks, became manager of the truck tire department, including both solids and pneumatics.

Mr. Wilson has pioneered the use of pneumatic tires for motor trucks and inaugurated many farm development and truck tours in various sections of the United States.

### BODY PLANT REDUCES PRICES

Baltimore, March 18—The Peters Auto Body and Spring Works has announced a 15 per cent reduction in the prices of commercial automobile bodies. This was made after a careful study of the present situation by Charles H. T. Peters. The announcement has resulted in a flood of orders and it has been necessary to run the plant overtime to accommodate the increased business. Many firms are now placing orders for trucks to handle spring business.

### 5,000 AT WILMINGTON SHOW

Wilmington, March 18—The annual Wilmington automobile show is believed to have been the most successful in the history of shows here. Notwithstanding that it was located in a building seven blocks from the main business artery and that an admission of 50 cents was charged the attendance was upwards of 5,000. The business outlook, as a result of the show, is very promising, according to dealers who exhibited there. They found that the visitors, more than ever before, were really interested in the new things in the motor field. Many prospects were secured and the ground was plowed for many more.

## Detroit Schedules Revised Upward Due to Brisk Demand

### Last Three Weeks Show Step-Up In Production Throughout Michigan Factories

DETROIT, March 18. — Indisputable evidence of the improvement in the automobile industry is shown in the step-up in production within the last three weeks in factories throughout Michigan. Practically every manufacturer outlined increased schedules for March production but in many cases the brisk demand noticeable since the first of the month has resulted in revision of those schedules upward. This is true particularly in Flint, which was hard hit by the depression.

The Buick plant now is turning out around 250 cars daily, the output for the last ten days ranging from 240 to 260. The Buick plant capacity in finished cars is 600 daily. During last year's peak Buick was employing 22,000 men. There are approximately 12,000 employed now working about 60 per cent normal time. Sales demand, Buick officials say, is better than was expected necessitating the sharp upward trend in production. The plant built approximately 200 cars a day in February.

Dort Motor Car Co., which produced about 700 cars in February now is turning out an average of 60 each day with 500 of the normal force of 1,500 men working full time. The new Dort model, officials say, rapidly is winning its way with automobile lovers and actual sales and prospects they say will necessitate another step-up in production by the end of March.

Conditions at Chevrolet while not so reassuring as in the other two cases are not such as to cause discouragement, officials say. The plant is working 1,200 of the normal force of 7,000 on a half-time basis.

## *Indianapolis Kept the Ball Rolling*

The show at Indianapolis was notable for the large attendance from out of town. The predominating colors used for decorating were blue and white, and purple shrouded posts that divided the various exhibits from each other. This color scheme was varied by brilliant yellow on the walls of the big building, decorated at intervals with designs in purple and white

## Railroad Is Experimenting in Store Door Delivery by Truck

### Special Containers to be Lifted From Cars to Motor Trucks for City Transportation

NEW YORK, March 18—An interesting experiment in the store door delivery of express matter will be undertaken by the New York Central Railroad Co. in cooperation with the American Railway Express Co. The plan will be put in operation first in Chicago and Cleveland and standardized trucks will be used in its development.

A. H. Smith, president of the New York Central, has been much impressed with the possibilities of the motor truck as an auxiliary to the railroad. After careful consideration of the subject, his engineers recommended the construction of special express cars which would carry nine steel containers uniform in size which could be loaded from the trucks at the point of origin and unloaded to trucks at the destination. The trucks will be driven to the point where the merchandise is to be loaded and then to the railroad yards, where the containers will be hoisted onto the specially constructed cars. When the destination is reached, cranes will lift the containers to the trucks and the merchandise will be delivered directly to the establishments of the consignees.

Each container will be 9 ft. by 6 ft. and will have a capacity of 6000 lbs. It is estimated that the cars which will carry them can be loaded and unloaded in 40 minutes. The New York Central is paying the expenses of the experiment and is providing the standardized trucks which are to be used. If the plan proves as successful as is expected it will be extended to the main shipping points on the New York Central system.

## Driving Force Behind Sales Increases Cleveland Trade

Cleveland, March 18—The driving force put behind sales promotion work by dealers and their corps of salesmen has enabled the automobile men to keep retail business in their line on the increase since the latter part of January.

The big drive on the part of dealers in used cars to dispose of their large stocks that they took on before the first of the year, has to an extent been a detriment to the sales of new cars, but everybody in the business seems to be moving forward from the standpoint of sales.

March has been a better month for the dealer here than was February. In fact, several dealers say they already have sold as many cars this month as they did the entire month of February.

### GOOD ROADS MEETING IN SOUTH

Greensboro, N. C., March 20—Good roads enthusiasts will gather here at the coming meeting of the U. S. Good Roads Association, the Bankhead National Highway Association and the U. S. good roads show which will be held April 18 to 23. In addition to formulating plans for the year's activity, the former association will appoint a committee to go to Washington and urge Congress to pass the bill appropriating $100,000,000 annually for the next five years to aid the states in building a system of highways and to make an appropriation and adopt a plan for a system of national and transcontinental highways.

## More Manufacturers Helping Finance Small Town Dealers

New York, March 15—To a greater extent than ever before motor car manufacturers are having impressed upon them the necessity of financing their dealers, especially in the smaller towns either directly or through automobile financing companies. The list of those which have undertaken this work is steadily expanding.

Among the latest to go into this field is the Liberty Motor Car Co. of Detroit which has begun the financing of its dealers on what is known as the floor plan.

The Chandler Motor Car Co. recently entered into an agreement with the Continental Guaranty Co. of Chicago to finance its dealers and a similar arrangement was made several months ago by Dodge Bros. with the Bankers Commercial Security Co. of this city.

The Maxwell Motors Co. has been financing its dealers for the past two or three months.

### GREATEST YEAR FOR STUDEBAKER

New York, March 18—The annual report of the Studebaker Corp. for 1920 shows net profits of $9,882,854 after deducting federal taxes, depreciation and other fixed charges. This was equivalent to $15.18 a share on the $60,000,000 common stock compared to $20.69 a share on the $45,000,000 common stock at the close of 1919. Gross sales for 1920 exceeded any other years in the history of the company at $90,652,362 compared to $66,383,307 in 1919.

### PETITION AGAINST RED DIAMOND

Atlanta, Ga., March 18—An involuntary petition in bankruptcy has been filed in the United States district court here against the Red Diamond Motors Co., Inc., of Athens, Ga., a company incorporated some months ago with $5,000,000 capital to establish a plant at Athens for the manufacture of a newly invented motor. Stockholders of the corporation are scattered throughout this country and Mexico. No statement of liabilities and assets has yet been filed.

### NEW LONDON ELECTS OFFICERS

New London, Conn., March 18—Thornton N. M. Lathrop was elected president of New London Automobile Dealers' Association at the annual meeting. J. P. Sullivan was named vice-president, Roy R. Palmer, secretary, and R. C. Smith, treasurer.

## Distributor Receives First Car Shipment in Four Months

### Note of Cheer in Fact That Increased Savings Deposits Show People Have Money to Buy

MINNEAPOLIS, March 19—While generally speaking there is only a slight lifting of the sales cloud situation, one optimistic note is struck in the receipt by the Pence Automobile Co., which buys Buicks for a large territory and distributes on its own account, of a train load of cars, the first time this train has moved its wheels for four months. The Pence company owns two trains and this one was composed of 76 cars, four automobiles to a car, which cost the firm just $411,139.20. Upon arrival of the train the company had just 30 cars left in the house.

It is the opinion of this firm that the savings bank increased deposits show that the people have the money to buy automobiles. This firm's retail sales have looked up. However, generally speaking, the country situation does not seem much improved from a financial viewpoint, as to motor car purchases. In the twin cities retail sales have improved somewhat with the mild weather, but a large percentage of these are from car owners and involving trades. The new business does not seem to be appreciable. In trucks there promises to be a better business.

Another note of interest is resumption of operation by the Minneapolis assembling plant of the Ford company. The rate of assembly reached this week is 250 cars a day. The branch reports 3,500 orders of cars for March delivery in Minnesota, northern Wisconsin, and eastern South Dakota. For April this is 6,000 cars. These are larger than a year ago. Dealers' stocks are said to be about cleaned up.

## General Motors Dividend if Trade Continues Improving

New York, March 17—Directors of the General Motors Corp. are expected to take dividend action in the latter part of this month. There is no intimation whether or not the dividend will be paid, but it is expected to depend largely on the showing made in the next two weeks. If there are indications that the present upward trend in business will continue permanently the payment probably will be made.

It is not probable immediate action will be taken by the corporation on the proposal to fund its bank loans of approximately $75,000,000 through the issuance of new securities, although the plan has not been abandoned definitely. The position of the company has been materially improved by the large reduction made in its inventory. It can be stated positively that no large additions or improvements to any of the General Motors plants are contemplated.

# Mechanics' Licensing Bills Meet Defeat in Four States

## Increase in Registration Fees Not Combatted Seriously—Gas Taxes Out of Favor

NEW YORK, March 18—Automobile legislation which has been introduced in the 40 state legislatures which began their sessions early this year is being sorted out and assimilated. Thirteen of the legislatures already have adjourned. It is estimated that approximately 1,500 bills have been introduced in the 40 states.

Increases in registration fees have been proposed in 34 states. Generally speaking they apply to commercial vehicles rather than passenger cars. In most states these fees are used for the maintenance of highways but in a few cases it is proposed to expend them for actual building of roads. The increases proposed vary widely but the industry has been gratified to note that in several states they follow closely the tax suggested in the proposed uniform motor vehicle law. Automotive interests are not disposed to combat seriously what they consider a reasonable increase on the theory that while they will benefit directly through improved highways all the tax payers in the state will benefit indirectly. It is significant of the trend of legislation however, that there is a tendency to increase fees each year.

**Try to License Mechanics**

Other subjects dealt with most generally in proposed legislation are size, weight and speed restrictions; obligatory equipment; indemnity bonds as a prerequisite to registration, stoppage at grade crossings, licensing of automobile mechanics; the classification of freight and passenger carrying motor lines as common carriers and a tax on the consumption of gasoline.

As a general rule, gasoline taxes, indemnity bonds and grade crossing stops are not meeting with general favor. Gasoline taxes were proposed in 12 states but already have been killed in four or five and have not much chance of passage in the others.

Measures providing for indemnity bonds have been introduced in 15 states but have been killed in several and are making little progress in the others. Measures for the licensing of automobile mechanics have been introduced in 10 states but have been killed in four and there is little prospect of their passage in the others.

### OKLAHOMA CITY SHOW IN APRIL

Oklahoma City, Okla., March 16—The fifth annual Oklahoma City automotive show will be held here April 11 to 16 inclusive in the new city coliseum when every important make of passenger car as well as trucks and farm power equipment will be represented. Many accessory dealers and factories will have exhibits. Preliminary interest by dealers, distributors and the public indicates a record attendance. Many Oklahoma City distributors will have dealer conventions during the show and all visiting dealers will be the guests of the Oklahoma Motor Car Dealers' Association at a banquet one night during show week at which speakers of national reputation will make addresses. More than 75 per cent of the floor space at the show has been sold.

# Hartford Dealer Orders Trainload of Cars as Show Result

*LANSING, March 18—As a result of retail orders taken at the Hartford automobile show, Russell P. Taber, Inc., Reo dealer for Connecticut, has ordered a trainload of cars and speed wagons for immediate delivery. The trainload is due to arrive in Hartford in time to permit delivery during the first week in April. Reo officials are greatly encouraged by the Taber order and the enthusiasm developed at the Hartford show, assuring an increased market in New England territory.*

*A feature in connection with the Taber order is the fact that touring cars predominated. A significant fact also is that the Taber company's territory comprises but six counties in Connecticut.*

# Renard, Thomas Mechanician, Killed in Collision in France

By W. F. BRADLEY
*European Correspondent of Motor Age.*

Paris, Feb. 27—Fernand Renard, Ballot race driver, and mechanician to Rene Thomas in the last Indianapolis race, was killed instantly today when he collided with an automobile truck in the suburbs of Paris. Renard, who was entered to drive a Ballot car in the next French Grand Prix, was carrying out carbureter tests in company with the chief engineer of the Zenith carbureter company when the driver of the truck suddenly swung across the road. The racing car was little damaged, but Renard struck his head against the body overhand of the truck and was decapitated. The Zenith engineer was taken to a hospital, but will recover. Renard, who was 32 years of age and married, had been connected with the Ballot team for ten years, but until last fall had always figured in the capacity of mechanician.

### FORD HEAD OF D. T. & I.

Detroit, March 10—Henry Ford has been elected president of the Detroit, Toledo & Ironton Railroad to succeed Joseph A. Gordon. The election took place at a meeting of the board of directors here when complete reorganization of the railroad was decided upon.

# Entries for French Grand Prix Are Closed with Nineteen Cars

## France, England, Italy and America Represented in 321-Mile Race, July 25

By W. F. BRADLEY
*European Correspondent of Motor Age.*

PARIS, March 2—Entries for the French Grand Prix 321-mile race have now definitely closed with a total of 19 cars representing France, England, Italy and America. The competitors, together with the names of the drivers so far as they are known, are as follows:

| | | |
|---|---|---|
| 1 | Ballot | Jean Chassagne |
| 2 | Ballot | Ralph de Palma |
| 3 | Ballot | |
| 4 | Ballot | |
| 5 | Fiat | Louis Wagner |
| 6 | Fiat | Pietro Bordino |
| 7 | Fiat | Ferdinando Minoia |
| 8 | Sunbeam | Rene Thomas |
| 9 | Sunbeam | Andre Boillot |
| 10 | Talbot | Dario Resta |
| 11 | Talbot | K. Lee Guinness |
| 12 | Talbot-Darracq | Zobrowski |
| 13 | Talbot-Darracq | Seagrave |
| 14 | Talbot-Darracq | H. J. Cooper |
| 15 | Mathis | |
| 16 | Duesenberg | Albert Guyot |
| 17 | Duesenberg | Inghibert |
| 18 | Duesenberg | Tom Milton |
| 19 | Duesenberg | Eddie Hearne |

All cars in the race are limited to a piston displacement of 183 cubic inches, with a maximum weight empty of 1,763 pounds. Eight in line engines will predominate, having been adopted by Ballot, Sunbeam, Talbot, Talbot-Darracq and Duesenberg. The Italian Fiats have four cylinder engines, but experiments are being carried out with eights in line and if any advantage is found these will be used in the race.

**High Fee Discourages Entries**

The number of starters is lower than was expected, this being due in a large measure to the high entry fees fixed by the Automobile Club of France. The fee for a single car is 15,000 francs, while the Deusenbergs which came in after Jan. 1 had to pay double fees or 86,000 francs for a team of four cars. The club refused to extend the period for admitting cars at ordinary fees, with the result that several entries, among them Belgian and Italian cars, were lost. The total amount received in entry fees, from the competitors, and tire and oil men who have stands on the course is 264,000 frances, which, with the subsidy of 250,000 francs offered by the town of Le Mans gives a total initial income from the club of 514,000 francs. The 183 cubic inch race will be preceded by a motor cycle Grand Prix, for which high entry fees have also to be paid. The races are attracting an immense amount of attention, and with the big gate fee which may be expected at Le Mans there should be no difficulty in covering expenses. Although designated the Grand Prix, no money prizes are offered in the French race.

## Government Will Mobilize Trucks in Event of Strike

### Talk of Railroad Labor Trouble Causes Council of National Defense to Make Plans

WASHINGTON, March 18 — Serious thought is being given by the administration to the possibility of a general railroad strike as a result of the announcement by nearly all roads that the wages of all classes of employees will be drastically cut in the interest of economy and in the hope that lower freight rates can be given to stimulate business.

Unofficial but none the less authoritative information has reached the White House that if the pay of their members is reduced, the four great brotherhoods will advocate a strike in opposition to such a program. While it is the general belief that if there were such a strike it would be of brief duration, the Council of National Defense is preparing for a mobilization of the motorized transport to prevent suffering and economic disaster throughout the country. It is known that the council has devised a plan for the allocation of motor trucks. This program is based upon concrete data already in its possession and from state legislation lists.

#### Ask Owners to Pledge Cars

In the last transport crisis when the brotherhoods threatened to quit, the Council of National Defense asked the various governors to obtain data as to the character, capacity, ownership and location of motor trucks throughout the the state. The governors in turn addressed communications to the municipal authorities asking for their cooperation in obtaining pledge cars from direct owners in the local zones.

Communications received from governors show that in the majority of states at least it will be an easy matter to organize an efficient transportation system over the highways. The federal government, however, is not prepared to render assistance in highway transportation in any such proportion as heretofore. The depletion of War Department trucks through sales has been rapid during the past year. According to army officials there are 19,000 trucks which are available for army purposes. Out of this total 13,000 trucks are in active service with the military service. The other 6000 machines could be placed on the road for service on receipt of an order from the Secretary of War. The Secretary of War is the chairman of the Council of National Defense. The War Department had approximately 40,000 serviceable trucks and cars a year ago.

#### EDWARDS WITH LAFAYETTE

Indianapolis, March 10—David F. Edwards, formerly assistant general manager of the new plant of the Willys Corp. at Elizabeth, N. J., where the Chrysler car is to be produced, has been elected vice-president and treasurer of the Lafayette Motors Co. to share with E. C. Howard, vice-president and secretary, and D. McCall White, vice-president, the active management of the company. The first executive position in the motor car industry held by Mr. Edwards was in 1911, when he became one of the two assistants to the president of General Motors Co. at Detroit, becoming comptroller and later vice-president of the Olds Motor Works. Four years later he was chosen an executive officer and director of the Gier Pressed Steel Co. of Lansing.

## Wisconsin Attitude Is Changed Toward Visible Gas Tank Pump

Milwaukee, March 11—The Wisconsin industrial commission, following a series of hearings at Madison, Wis., has decided that it will not recede from its rulings of a year ago, prohibiting the use of electrically driven gasoline pumps in serving customers at public or private service stations. The commission, however, decided for a change in the prohibition against the use of glass tank pumps, by permitting the use of such devices, provided they are so equipped that they will drain immediately after the customer has been served. The glass tank manufacturers pleaded that their devices, and not the other kinds, give the customer visible evidence that he is getting full measure at the service station, and regarded the plea of the Wisconsin fire authorities that these tanks are extremely dangerous, as exaggerated.

## Insurance Companies Act to Reduce Number of Accidents

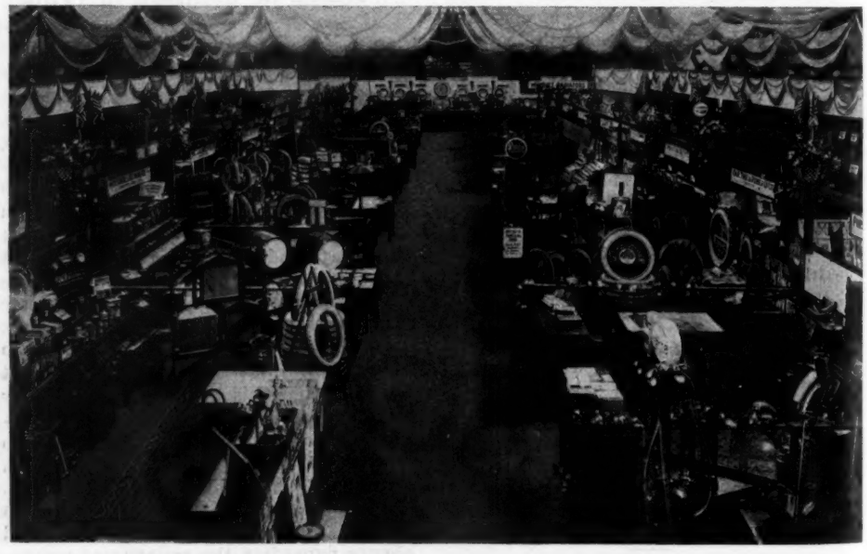
### Under New Policy Burden of Carelessness and Negligent Operation Will Be on Operator

NEW YORK, March 14—An important step toward reducing the number of automobile accidents and toward lessening insurance collision rates has been taken by the Aetna Life Insurance Co. and its affiliated companies, the Aetna Casualty & Surety Co. and the Automobile Insurance Co. of Hartford, in eliminating the sale of full coverage collision insurance from March 9 on. Under the new plan only that form of collision insurance which provides for the insured paying the first $50 or $100 of each collision loss will be sold.

This action has been taken individually by the companies and is designed to throw the burden of careless and negligent motor car operation upon the operator. Insurance brokers and agents have been notified of the company's action and the reasons for it. Their support has been particularly sought in a movement to eliminate full collision average insurance in the Greater New York zone, because of the heavy traffic.

By making this change company officials expect to accomplish something more effective and constructive in the way of reducing preventable insurance accidents than the mere action of increasing rates.

## *Winnipeg Holds First Equipment Show*



Intertwining of the British and American flags was a notable feature of the decoration of the first automotive equipment show ever held in Winnipeg, an exposition which drew large crowds and fine patronage. The show, held under the auspices of the Western-Canadian Automotive Equipment Association, composed of jobbers, manufacturers and manufacturers' representatives, was participated in by both Canadian and American exhibitors. The patronage included both dealers and consumers and wholesale and retail sales were highly satisfactory in volume. The show ended with a banquet at which both Canadians and Americans were speakers, telling of the giant strides made in the automotive business in Canada through the agency of co-operation between American and Canadian manufacturers and merchants

# Ford Not Seeking Financial Assistance to Operate Plant

## Reasonably Certain, However, That Company Will Ask for Loan Next Month

DETROIT, March 14—The Ford Motor Co. today is employing more than 20,000 men turning out around 3,000 cars a day, and in the vernacular of the street is going it alone insofar as finances are concerned. MOTOR AGE is able to say positively that Mr. Ford is not seeking financial assistance, and for the time being at least is operating successfully without it.

Just how long the company will be able to continue operation without financial help is a matter of conjecture, though it is reasonably certain that the company will ask for a bank loan about the middle of April when the 30-day extension period granted the Ford company by the government for the payment of the first installment of taxes will have expired. That this money will be available without any delay or controversy also is certain.

**Question of Treasurer Arises**

The facts in the Ford financial situation are as follows: In January Mr. Ford sent to New York for a representative of the New York bankers to come to Detroit to discuss finances. This representative came and the situation was gone over thoroughly. The banker suggested that Mr. Ford would need about $50,000,000. Edsel Ford, however, was of the opinion $75,000,000 would be required. This did not stagger the banker who informed them that it would be perfectly agreeable for them to have $75,000,000 or $100,000,000 if they wanted it.

The hitch came when, as the climax of negotiations, the banker set forth conditions upon which the loan would be made among which was the stipulation that a treasurer must be installed to succeed F. L. Klingensmith who would be satisfactory to the bankers. Mr. Ford was asked to name three men which he did, one of whom was W. R. Campbell of the Canadian Ford plant. The bank representative scratched out the name of one man but announced that either Campbell or the third man would be all right. Campbell at that time came over to the Ford plant and remained for more than a month, and it was presumed he would be made treasurer, though he finally has determined not to join the organization. With the matter of the treasurership settled, it looked as if the loan would be made, but Henry Ford balked at one other condition and refused to accept the loan with this stipulation. He expressed the determination to go ahead with production without the financial help, and the bank representative advised him that he felt confident Mr. Ford under the circumstances, could do this successfully.

This advice was given in view of the fact that Mr. Ford had reduced his indebtedness to around $24,000,000 by the conversion of Liberty Bonds, which had been deposited as collateral to secure the loan. The further fact that Ford cars were selling steadily and that the company was reducing its inventories at a good rate prompted the banker to offer his suggestion that it would be possible for Mr. Ford to operate without financial help at least until this bank indebtedness became due together with the government taxes.

**Working on Own Money**

The loan sought in January and the loan that will be made in April—if it is made—was to be at 8½ per cent gross, considered by bankers to be very reasonable. During the negotiations Henry Ford and his son, Edsel, agreed that they would not make any dividends pending the life of the loan, volunteering this to the banks' representative. The bank indebtedness against the Ford Motor Co. represents notes upon which renewals have been asked five times, it is reported. It also is said with reasonable assurance that a sixth renewal on a majority of these notes will be possible, though there may be some banks unable to continue the loan and there may be others, which for various reasons, will refuse this sixth renewal. The personal taxes of Henry and Edsel Ford are declared to be neglible when taken in comparison with the other indebtedness.

In the final analysis Ford is operating on his own money and apparently succeeding beyond his hopes. There is always ahead of him the beacon light furnished by the bank syndicate's representative that any time he needs the 50 or 75 million, he can get it by a brief telegram to New York intimating that the conditions will be satisfactory. It can be stated positively also that these conditions do not impose in any way control of the Ford factory or even a bank representative in any authoritative position except that the treasurer selected by the Ford Motor Co. may be a man acceptable to them.

# Style Week Used by Dealers to Help Enclosed Car Sales

Milwaukee, March 18—Linking up the motor car industry with the Style Week campaign of dealers in men's and women's wear, thirty of the best known passenger car dealers of this city during the past week observed "Milady's Car Week" with excellent results in the direction of stimulating trade generally, but more especially in enclosed cars. The idea was a unique one and is believed to be brand new to the American trade. Style Week is an annual event for apparel dealers, having been instituted four years ago.

The dealers dressed up their salesrooms in cut flowers, potted plants and other decorations suggestive of spring and put on display their enclosed car models, at the same time adding touches of refinement here and there to make the salesrooms especially attractive to women visitors.

# War Department Sees No Bad Effect from Sale of Stocks

## Makes Public Letter from President of Baltimore Association to Support Contention

WASHINGTON, March 18—Fears of automobile dealers as to the effect of sales of surplus trucks and passenger cars by the U. S. Army are not founded on facts, according to a statement issued by the War Department. The Government has made public a letter signed by A. H. Bishop, president of the Baltimore Trade Association, Inc., in which it is admitted that the apprehensions of dealers was to a large extent groundless.

The letter of the Baltimore organization is significant inasmuch as the War Department has announced that sales of surplus army automotive equipment will be held in a few weeks at Camp Jessup, near Atlanta; concentration camp at South Amboy, N. J., and at Norfolk. The material which will be offered for sale is listed as unserviceable and bidders are advised to inspect the stock during the three days prior to the auction.

The War Department says that Baltimore dealers actually derived profits from the sale at Camp Holabird. It is said that visitors, who were attracted to the army camp by the sale conditions, invested their money in new or serviceable cars instead of buying the army junk-pile. Statistics compiled by the War Department on the sales at Camp Holabird show that 90 per cent of the buyers were from places other than Baltimore.

# Skelton Taken Over by Traves Following President's Death

St. Louis, March 17—W. F. Traves, head of the Talbott Reel Mfg. Co. and an official of the American Knockdown Bottle Case Co., both of Kansas City, has arrived in this city to take over the interests in the Skelton Motors Corp. which he purchased from Dr. L. S. Skelton shortly before the latter's death.

The general offices of the Skelton company have been moved so that they now share quarters with the Premier distributor, the Murphy Machinery & Equipment Co. Both retail and wholesale work will be done there. The name of the producing company has been changed to the "Traves Motors Company, Successor to the Skelton Motors Corporation."

Mr. Traves states that the former officials will be retained including W. A. Chapman, general manager; J. A. Schroeder, chief engineer; and George Sherwood, production manager. The name of the product, Skelton, will be kept for the present.

Dr. Skelton sold his interest in the Skelton corporation so that he might give more attention to the Premier Motor Corp. of which he was the head at the time of his death.

## Congress Ready to Consider Bills That Affect Industry

### Anti-Dumping Measure Is Included in Legislation to Be Brought Up

WASHINGTON, March 18—Congressional leaders have accepted a tentative legislative program for the next session which includes the anti-dumping bill designed to prevent unfair competition by other nationals. It is significant to note that little interest was evinced in the anti-dumping measure until Pacific coast truck dealers showed Congress the need for enactment. The bill which has passed the House will undoubtedly be revised to meet existing conditions and check the flood of foreign products to American markets. Senator Penrose and Chairman Fordney of the House Ways and Means committee will supplement the measure with an amendment to the tariff law to levy customs at American valuation. These two proposals having to do with protection of domestic markets will be written into the statutes within a few weeks as Congress convenes April 11.

Just what the revision of assessment policies as proposed by Senator Penrose would have upon the automotive industry is easily noted. For instance, it is reported by the Federal Trade Commission in its report on farm implement trade that mail order houses have been selling spare parts for automotive products at prices which defy dealer competition. It is known that certain mail order houses have their agents operating among foreign manufacturers. Through a system of equitable distribution of orders in foreign countries, these American importers find it possible to obtain prices which, with ocean-freight and duty added, would remain below production costs here. The valuation is made at port of shipment and the customs officials abroad have little chance to contest the figures as the manufacturers would have their instructions in this respect. With American valuation restored to the books, importers would be assessed on the wholesale prices of the goods in this country instead of abroad.

Senator Smoot who had charge of the anti-dumping bill in the Senate believes that even in its present form it would cover imports of trucks originally made in this country but sold through the army to foreign merchants and offered for re-sale here. It is the purpose of the Senate leaders to make the amendment to the tariff law put an end to such practices. Hearings will probably be held on the proposed amendment and the anti-dumping bill early next month as these legislation proposals have preferential treatment.

### KELLEY TIRE CHANGES NAME

New Haven, Mass., March 17—Directors of the Kelley Tire & Rubber Co. have amended the charter changing the name to the Martin Tire & Rubber Co. The main reason for the change was the fact that the Kelley-Springfield Tire Co. had brought suits because of the similarity in names. It was announced that James Martin who has been elected president, had purchased 10,000 shares of the Kelley Co. stock from Edward J. Kelley president of the old company and had given an order for $500,000 worth of tires besides arranging for a credit of $100,000 to purchase rubber. The company is not yet in production but it is said work will begin soon in the new plant at West Haven. With the exception of the president, the old officers have been reelected.

## Lincoln Schedule: 250 Cars in March and 400 in April

Detroit, March 17—Lincoln Motor Co., which rapidly is nearing 100 per cent production, has outlined a schedule of 250 cars for March and 400 in April. Lincoln Motors has not been down, and throughout the entire period of depression has been employing close to 1000 men, according to an official of that company.

The company last week began taking on new employees, and at present is working around 1200 men. Prior to last week the force of employees had been working half time, but in the latter part of last week a full-time schedule in all dpartments of the plant which had been in operation was put into effect.

While the entire plant is not operating at capacity, employees are being added each day. The company built more than 125 cars in February.

The dealer reports are very optimistic, the officials say, and it was said an average of three new dealers and distributors were being assigned territory each week.

## Model Truck Service Station Is Aim of Toledo Distributor

Toledo, March 18—Owen & Graham of Detroit, distributors for the General Motor trucks, will build a new home here to be completed by Oct. 1. The plant will cost $180,000. This city will be made headquarters for distribution in twelve counties of northern Ohio and southern Michigan. The company has been in the business in Dertoit for fourteen years.

Clarence Camp, who has been made Toledo manager, declared that the location in Toledo had been selected after a survey of the territory had shown a need for expansion of the use of commercial vehicles.

"Service is the leading feature of our business policy," he said. "We will make our new building a model for service stations for commercial vehicles. Seventy-five per cent of our sales have been the result of repeat orders. The profits of such orders are charged up to our service department and that gives them a real incentive to intelligent work."

## Will Sprint Races Supplant Longer Events Now Being Run?

### Following Last Program at Beverly Hills Course, Change May Be Made There

LOS ANGELES, March 18—Sprint races, such as those that have been run on the Beverly Hills speedway, are so much more interesting than long races to the public that there is a probability they will be adopted exclusively for future programs at that course. For many years, it was the opinion among race promoters that any event shorter than 250 miles would not prove popular with the public. That the public no longer cares for events of this kind has been proven conclusively here.

The first sprint races here were inaugurated on the old Ascot course about three years ago. The public immediately approved them. Two sprint programs have been put on at the Beverly Hills course and now it is doubtful if the long grinds have not passed out never to return. The monotony of the long races to the public is the chief objection. Drivers say they prefer the shorter events and certainly the time always is faster. At many as eighteen cars have started in 250-mile events and only six or seven have been running at the finish. This takes the interest out of the race. In the old days of road racing it was necessary to start 20 or more cars to make certain enough would be running at the finish to win all the place prizes.

The recent program on the Beverly Hills track was the most interesting ever held. There were four preliminary contests of 25 miles and a final of 50 miles. The speed attained was the fastest ever made by cars of 183 cu. in. piston displacement. Such time as Ralph De Palma made when he negotiated one lap at the rate of 111 miles an hour had been regarded as impossible. Fifty miles at an average of 107 miles an hour keeps the spectators in a thrill of excitement every minute and the crowd demands a thrill or it will not come again.

### ATTACH ADRIAN PROPERTY

Detroit March 19—Property of Adrian Tractor Co. at Adrian, Mich., has been attached by several concerns holding claims for construction material. The Adrian Tractor Co. was formed last fall, and a sale of stock to secure funds for the construction and operation of a factory was begun but was stopped by the industrial depression.

### SHERIDAN NEEDS 5,000 BODIES

Detroit, March 18—Erdman-Guider Co. officials announce receipt of an order for a large number of bodies for the Sheridan unit of the General Motors Corp. The bodies are constructed in Saginaw and painted and trimmed in the local plants. Company officials say indications are that the company would require an output of 5,000 bodies this year.

## Accessory Lines Productive of More Profits to Dealers

### Speaker at Convention Says That Possibilities Are Not Being Appreciated

ATLANTA, March 18—R. A. Stranahan, president of the Champion Spark Plug Co., and of the National Automotive Equipment Jobbers' Association, predicted that there would exist a shortage of motor cars in the United States by May and June of this year, in an address before the Southern Automotive Equipment Jobbers' Association which held its annual convention here.

Stranahan declared that Champion business during January and February of this year compared very favorably with the same months in 1920, while advance specifications from dealers and jobbers were better for March of this year than the same month in 1920, and for April of the present year were more than 100 per cent greater than April, 1920. Orders, however, he stated, were still low, not more than one-third or one-half as great as during the same period in 1920. In the sale of manufacturers' equipment he declared that 1921 would fall considerably below the record of 1920, but expressed the belief that the accessory and equipment business as a whole for 1921 would surpass the volume of last year.

**Replacement Means Big Business**

Discussing the outlook for the present year from the accessory and equipment standpoint, Stranahan said that replacement business from the 1,900,000 motor cars manufactured in 1920, and the 340,000 trucks, would come this year and therefore every indication pointed to a greater equipment business than in 1920. Probably about 1,200,000 motor cars would be manufactured this year, he said, while there would be a demand for a million and a half.

Stranahan told of a trip by automobile from Florida to Atlanta, declaring that he stopped for oil, gasoline, etc., at about a dozen stations along the route. In each of these stations accessory lines were carried but in not a single instance, he said, did a dealer endeavor to sell him anything in the way of accessories.

**Better Accessory Displays**

"These dealers did not even have the accessories and equipment they carried displayed to advantage," Stranahan said. "That is one of the primary reasons they are not selling accessories or making the money it is possible to make from these lines. Every man who drives his car up to a service station is a possible accessory customer, and if the dealers would only use a little salesmanship in this regard they would add materially to their incomes. The ordinary dealer sells accessories and equipment only to customers who come into his place and ask for some particular thing. Hundreds of additional sales would be made if every dealer would push these lines, display them to advantage, and tell his customers about them instead of waiting until they ask him."

Stranahan urged the jobbers through their salesmen to carry on an educational and promotion campaign among the dealers, to get them to a point where they will push these lines because they can make a great deal of additional profit if they would follow that method.

## Truck Drivers Finish Course at Cleveland Safety School

Cleveland, March 18—Eight hundred truck drivers received graduation certificates at the exercises conducted last Monday night at the school of the Safety Council of the Cleveland Chamber of Commerce.

Certificates with gold stars attached were issued to 352 drivers who did not miss a lesson of the series of eight. Certificates with red stars went to 273 drivers who missed but one lesson, and plain certificates went to drivers who attended not less than six sessions of the class.

The registration for the course was 1443. The average daily attendance was 897.

A double quartet of the American Railway Express Co. sang at the graduation exercises and brief talks were delivered by M. F. Bramley, president of Templar Motors Corp., and O. L. Prior, chairman of the motor drivers' school committee.

The sessions had the support and active co-operation of owners of trucks, employees and the Cleveland Commercial and Passenger Car Dealers' Association.

## Valve Gear and Engine Design Shown at Meeting of Engineers

Chicago, March 17—At the meeting of the Mid-West Section of the S. A. E., Chester S. Ricker and John Moore, consulting engineer and chief engineer for the Lexington Motor Car Co., presented a paper on the design of valve gear and engine design as applied to the new Ansted engine used exclusively in the Lexington car. The paper was supplemented with moving pictures showing the unique production methods used in the construction of the engine. The "rocking chair" valve motion for the operation of the overhead valves was explained by the use of an animated moving picture.

The results of a complete set of tests on the road and re-run on the dynamometer under duplicated road conditions were also presented with the aid of graphic charts. One consideration, the presence of several humps in the vacuum lines showing manifold depressions was the basis of a long discussion. Mr. Purdy of the Rayfield Carbureter Co., proposed several possible reasons, but by a series of illustrative examples, showed that these reasons were without grounding and therefore valueless.

The meeting was one of the best attended that the Mid-West section has ever had, something like 125 members and their friends being present.

## Tire Dealers in Wisconsin in Organization to Help Industry

### Association Formed as Development of Effective Work Carried on in Milwaukee

MILWAUKEE, WIS., March 18—The Wisconsin Tire Dealers' Association was formally organized at a meeting of nearly 250 men engaged in the tire and repair business held at the Hotel Pfister here on March 14. Officers were elected as follows:

President, J. B. Cudlip, Oshkosh; vice-president, Henry O. Stenzel, Milwaukee; secretary, E. H. Berge, Milwaukee; treasurer, J. E. Thompson, Milwaukee; directors, F. F. Pope, Fond du Lac; H. A. Schwalbe, Sheboygan; H. G. Edwards, Madison; W. E. Gnatzig, Whitewater; A. Zanders, Merrill.

The state association is a development of the effective work accomplished by the organized activity in Milwaukee by the Milwaukee Tire Dealers' Association. This body grew out of a war-time organization of a voluntary character, designed to effect conservation to help win the war.

At the state organization meeting following the election of officers, President Cudlip presented a program of work for the first year, enunciating the purpose of the association as follows:

"This association is formed to advance as well as safeguard the business interests of tire dealers, and to promote co-operative relationship between manufacturer and dealer and the buying public, and to protect the industry as well as the consumer from the depredations of elements existing in the business which destroy rather than build up confidence in the merchandise and methods of honest and legitimate members of the trade."

A banquet concluded the convention. A semi-annual convention will be held in Milwaukee during State Fair week.

## Citroen Makes Further Cut of 10 Per Cent in Car Price

By W. F. BRADLEY

*European Correspondent of Motor Age*

Paris, Feb. 16—Citroen has made another cut of 10 per cent in the price of his cars, thus bringing the price of the four-seater down to 14,310 francs. The sedan is listed at 21,600 francs. This cut is made in the form of a 10 per cent discount to covery the luxury tax applied in France on all automobile sales. Instead of this tax being paid by the client, Citroen now pays it for the client, and makes use of this publicity to protest against the government tax. Citroen still holds the position of marketing the cheapest car of French construction on the market. Renault, who is now in direct competition with Citroen, with a four-cylinder 10 hp. four-passenger model, officially maintains his price at 21,000 francs, but as dealers hold stocks sales are often made at 16,000 francs, and sometimes a little lower.

# Concerning Men You Know

H. D. Higinbotham, president of the Jackson Motor Co., Joliet, Ill., has retired and disposed of his stock to George S. Jackson, who has been elected president.

N. H. Van Sicklen, Jr., vice-president of the Van Sicklen Speedometer Co., will be in charge of the Elgin, Ill., plant, following its absorption by the Stewart-Warner Corp.

Harold W. Slauson has joined the Kelly-Springfield Tire Co. and is in charge of the engineering service department at the main offices, New York City.

George Younger has become manager of Franklin retail sales for the Keystone Motors Co., Louisville, Ky., which in addition to handling the Briscoe has obtained the Franklin franchise for the Louisville territory.

Walter Deisher, formerly of the Reo Sales Agency, Ottawa, Ltd., has been busy completing the arrangements for the formation of a company with an authorized capital of $50,000 to be known as the Automotive Sales & Service, Ltd. The company will handle distribution and sales for the Reo motor cars, Reo speedwagons and National trucks

L. J. Kramer, formerly with the Master Truck Co., has joined the sales force of the United States Motor Truck Co.

R. T. Walsh, formerly advertising manager of the King Motor Car Co., and later with the Apex Motor Corp., at Ypsilanti, has joined the organization of the Service Corp., in the Detroit branch. The company specializes in readjusting and rejuvenating sales development work.

J. Harry Schumacker, for twelve years in the automobile business in Philadelphia, has sold his interest in the firm that bears his name to his partner, James Bromley.

Charles B. Vogt has been appointed Philadelphia branch manager of the United States Tire Co., succeeding J. E. Given, who has resigned.

F. W. Schulz, formerly sales manager of the West Side Elgin Co. of Milwaukee, has opened offices in Madison, Wis., for the distribution of the Elgin in Dane, Columbia, Sauk and Iowa counties.

The Motor Sales Co., Stevens Point, Wis., has changed its corporate style to Currier & Rannach, Inc.

O. A. Huelsman, Fond du Lac, Wis., has been appointed Dodge dealer.

Dayton Keith, for three years distributor of the Ford car and Fordson tractors in the central Illinois territory, has disposed of his interests at Bloomington, Ill., and has become manager of the Wills Sainte Claire Co. of Illinois in Chicago.

E. J. Hermann, assistant sales manager of the Martin-Parry Corp. of New York, has been promotd sales manager for the territory handled from the Indianapolis plant. Mark E. Hamer, formerly in the advertising department of Nordyke & Marmon Co., has been appointed advertising manager of the Martin-Parry company wth headquarters in the Indianapolis office.

L. F. Joliat has been made manager of the Detroit branch of the Miller Tire & Rubber Co. He comes to Detroit from Cleveland where he was with the Goodrich organization.

W. G. Torrance, formerly with the purchasing department of the Timken-Detroit Axle Co., has taken over the sales end of the Lincoln Steel Products Corp., Detroit.

William H. White has been made manager of the Fidelity Motors Co., Baltimore, Peerless distributors for Maryland.

Malcolm A. Campbell has been appointed sales manager for the Apperson-Baltimore Co., Apperson distributors in Baltimore.

S. Gordon Hyde has resigned as advertising manager of the Buda Co., Harvey, Ill.

Harry Wilkin Perry has resigned as general manager of the Trailer Manufacturers' Association, effective when his successor is appointed.

R. H. Johnston, who has been vice-president of the White Motor Car Co. with headquarters in Washington, has resigned to enter the investment banking business in New York. He foremrly was manager of the White branch in New York and president of the New York Dealers' Association.

Fred P. Steele has joined the Stutz Motor Car Co. of America, Inc., and will represent the factory in the Atlantic coast district. Homer R. Horsfall, for the last five years with the Overland, is with the Stutz company with sales supervision over the western and Pacific coast territories. Fred Wilson is with the company as assistant sales manager.

T. B. Blakiston, formerly district sales manager for the southeast territory for the American Hammered Piston Ring Co. of Baltimore, has been promoted to the position of assistant general sales manager, replacing J. H. Quackenbush.

## "Speechless" Dinner When Old Timers Meet At Reunion

Philadelphia, March 18—The "Old-Timers'" reunion, at the annual dinner of the Philadelphia Automobile Trade Association, at the Ritz-Carlton hotel, was an absolutely "speechless" function. About two hundred members and guests participated.

There was not even a toastmaster. W. H. Metcalf, chairman of the banquet committee, confined his function to directing the elaborate vaudeville entertainment.

## Automobile Club of America To Stage Show for Members

New York, March 19—The Automobile Club of America is planning to hold an automobile exhibit in the headquarters, 247 West Fifty-fourth street, during the week of April 4-9.

Most of the space, which will accommodate about 30 cars, has been spoken for by New York dealers and some of the factories. It is planned to hold the show for the benefit of the club members, and admission will be by invitation.

In announcing its intention to stage the exhibit the A. C. A. expresses the opinion that the project should prove a strong sales stimulant in the metropolitan district, because it will attract motor car owners who are members of the club and thus provide an interested audience with a high percentage of purchasing power to which dealers may address their selling effort. It is expected that the show will bring the club much favorable publicity and stimulate interest in membership.

## February Orders for Lincoln Show Increase of 100 Per Cent

Detroit, March 18—President Henry M. Leland declared February orders were 100 per cent greater than January and March orders were relatively increased, in his annual report read to approximately 100 stockholders at the annual meeting of the Lincoln Motor Co. yesterday. Mr. Leland also said orders for $200,000 worth of automobiles were received yesterday. He announced that a step-up in production this week would be followed just as rapidly as the business demanded.

Mr. Leland also announced that the company recently had obtained bank loans sufficient to meet all requirements.

The company, Mr. Leland said, had at no time ceased the production and shipment of automobiles, and declared the highest point of production yet reached was 25 cars a day. A schedule of 20 a day had been planned for April, Mr. Leland said.

Directors re-elected at the meeting were H. M. Leland, W. C. Leland, Wm. T. Nash, John Trix, Joseph Boyer, Wm. H. Murphy and John H. Emmert, all of Detroit, and G. H. Kinnicutt and Robert K. Cassett of Philadelphia. H. M. Leland was re-elected president, W. C. Leland, vice-president and general manager and Nash, secretary-treasurer.

## High Rents Forcing Hartford Dealers to Change Quarters

Hartford, Conn., March 19—Increasing high rents have had the effect of causing Hartford dealers to seek other quarters. For some time past it was realized that a site just over the Connecticut river bridge in East Hartford was desirable. The Hartford Buick Co. is the first to make the move. Operations have already begun for the erection of a $100,000 plant on the boulevard having a frontage of 200 ft. and providing 34,000 sq. ft. of floor space. G. M. C. sales and service quarters will be located in the same building. The construction of the building is such that it can be devoted to other uses should necessity arise. A spur track runs into the property.

Other Hartford dealers have arranged to move over the river, some of them being forced to move through the termination of their leases. Present indications point to quite a sizable colony over the river bridge. The location is easily accessible from Hartford, and the value of it is materially enhanced by the improvements now being made by the city of Hartford in its bridge approaches.

### WHITE PROFIT LESS IN 1920

Cleveland, March 18—Operating profit of the White Motor Co. for 1920 after deducting maufacturing, selling and administrative expenses, amounted to $3,486,704.

After charging off $1,193,927 on inventories to make them conform to market value, deducting $51,206 loss on government bonds and allowing $300,000 for federal taxes, the White Co. for the year ending Dec. 31, 1920, showed a profit of $2,410,074, compared with $2,869,875 the preceding year.

Inventories were heavier by about $7,000,000 than in 1919, but after taking a loss of $1,193,927 and paying $2,000,000 in dividends the company was able to carry $410,914 to surplus, compared with $1,429,875 in 1919, when dividends were $1,440,000.

### AUTOMOTIVE WEEK IN OTTAWA

Ottawa, Ont., March 18—Ottawa will have an "Automotive Week" during March if the plans at present being considered are carried out. The first annual show last year was a distinct success and it is certain that under the brighter business prospects of this year business will benefit to a very large extent.

# DuPont Report Gives Details of Purchase of General Motors

## W. C. Durant in Disposing of His Interest Received $9.50 Per Share for Holdings

NEW YORK, March 18—Details, hitherto carefully concealed, of the spectacular financial transaction by which W. C. Durant retired almost over night as head of the General Motors Corp. are disclosed in the annual report of E. I. duPont de Nemours & Co. It shows that when Durant was unable to meet his obligations last November, the duPont Securities Corp. took over 2,504,273 shares of General Motors stock. He received for his holdings $23,790,600 in cash and 40,000 shares of the stock of the Securities corporation which was formed to buy his General Motors stock.

It is stated in the report that the taking over of the stock was at the request of Durant, who had informed the duPont interest that "he desired to resign and sell his interest in the corporation to liquidate his personal indebtedness, which was very large and pressing."

### Estimate Price at $9.50 Per Share

On the basis of the amount of money paid to Durant it is figured that he received $9.50 per share in cash for his General Motors holdings. The 40,000 shares of stock of the duPont Securities Corp., it is stated, have since been exchanged for 230,000 shares of General Motors common stock, which again gives him a substantial holding in the concern. If a value of $13 per share were placed on this amount of stock it would add $2,990,000 to what Durant received for his original holdings and would bring the amount up to about $10.70 a share.

At the time of the transaction there was much speculation in Wall Street as to just what amount was involved in the exchange. Estimates made at the time placed the amount at $27,000,000, but it was also gossiped around the street that Durant received only between $7 and $9 a share.

The financing of the transaction whereby the stock was taken, it was pointed out, was by the sale of $20,000,000 one-year 8 per cent collateral trust bonds of the duPont Securities Corp. through J. P. Morgan & Co. These bonds fall due on Nov. 22 of this year, but in consequence of this maturity the report states that the officers "are now working on plans for the permanent financing of this additional investment on the General Motors Corp. the details of which plan will be communicated to the stockholders as soon as completed."

In addition to the notes sold through the banking firm, the duPont American Industries Co., the stock of which is 100 per cent owned by the E. I. duPont de Nemours Co., paid into the treasury of the duPont Securities Co., $4,200,000 in cash and loaned 824,179 shares of General Motors, for which is received $4,200,000 in shares of the 8 per cent cumulative preferred stock and 36,000 shares of the non-voting common stock of the new company. The Chevrolet Co. paid $2,800,000 in cash and loaned $549,453 in shares of General Motors, receiving $2,800,000 preferred and 24,000 shares of the common stock of the duPont Securities Corp.

By this method it was also pointed out the duPont Securities Corp. obtained $27,000,000 in cash and borrowed 1,373,632 shares of General Motors common stock. This stock, with the 2,626,368 shares taken over from Durant, gave the duPont Securities 4,000,000 shares of General Motors which was pledged with the bankers for the $20,000,000 loan. It is also stated that the banking group received 20,000 shares of the common stock of the duPont Securities Co. as a commission for the loan. This was paid out of the 60,000 shares received by the duPont American Industries and the Chevrolet Co.

### Studebaker Rumors Denied

The report also states that under the same transaction with Durant the duPont Securities Corp. took over 122,095 shares of General Motors common from a syndicate consisting of the duPont, the Chevrolet companies and Durant. For this stock they paid $2,163,557 cash, which was the equivalent of $17.72 a share. This stock, however, has since been sold.

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New York, March 14—Formal denial has been made by W. C. Durant that he is seeking control of the Studebaker Corp. to make it the nucleus for Durant Motors, Inc. The reports became current when Durant bought a large amount of Studebaker stock in the market.

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# Red Fire, Horns and Cow-Bells Used to Herald Show Opening

Fort Wayne, Ind., March 17—With an admission price of only twenty-five cents and with an early spring making everyone feel enthusiastic and optimistic, the Fort Wayne automobile show had no difficulty in attracting big crowds to the far eastern part of the city where the annual event was held in the gymnasium of Concordia College.

Preceding the show each evening there was a band concert in the down-town section and then a parade to the gymnasium headed by the band and the dealers in automobiles. The show was very heavily advertised by the dealers in their regular newspaper advertising and it was also advertised extensively by the Fort Wayne Auto Trade Association which sponsored the affair. Also the local newspapers issued special show editions of sixteen and twenty pages which contained announcements of the local dealers and which also ran a lot of interesting copy about automobiles, the show and other matters of interest to local motorists. Additional publicity for the affair was secured on the opening night when red fire, the tooting of horns, the ringing of cow-bells and the making of other noise announced that the affair was on.

# Little Movement in Tractor Sales Is Reported in South

## Demand Is Expected to Increase Through Farmers Growing More Diversified Crops

ATLANTA, March 18—While it is the consensus of opinion among the tractor distributors of the Atlanta territory that the crisis in this section has been passed so far as the tractor industry is concerned, and that sales are experiencing a gradual improvement, still the total volume of business is far below the normal mark and these conditions appear likely to exist until the readjustment period has become a thing of the past and all lines of business and industry in the South have returned to full normalcy. As one prominent distributor in Atlanta summed up the present condition of affairs affecting the industry, "We must look the situation squarely in the face and do what we can to meet it. True, the real crisis has been passed, but we must all sit steady in the boat for a time. There is no use fooling ourselves into the belief that business is good when our record of sales show it to be otherwise."

### Cutting Cotton Acreage

When business does return to normalcy in the South, when money is easier to obtain and the lines of credit loosen to some extent, a big demand for tractors is foreseen on account of the fact that the South is drastically reducing cotton acreage this year and diversifying its agricultural products. There is no longer any doubt but that the cotton producers of the belt will this year cut cotton acreage by from 33 1/3 to 50 per cent, and that the South will grow one of the shortest cotton crops in its history.

One of the primary reasons distributors in this section are finding tractor sales rather few and far between at the present time lies in the fact that many of the dealers, especially those in the smaller towns, have strained their credit almost to the breaking point.

In January the tractor business in the Southeast was really at a standstill, but during February a few sales were made. March has been about on a par with February, but a gradual increase in business is noted and there is a better feeling among the distributors and dealers than there has been for several months.

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### CHARTER AUTOMOTIVE SCHOOL

Milwaukee, March 17—The School of Automotive Electricity of Milwaukee has been incorporated with a capital stock of $100,000 as a development of the department established about two years ago by the School of Engineering of Milwaukee to train specialists in automotive electrical engineering. The department has grown to such an extent that it has been separately organized, but remains affiliated with the parent institution. E. J. Consoliver is dean.

# A Department of BETTER BUSINESS

*Conducted by* Ray W. Sherman

## Every Man Off Street Car Line a Prospect

Every man who resides on the outskirts of the city or in a suburb and who is four or more blocks from a car line and who has no automobile is a prospect. Perhaps he may not be a prospect for a new car, but he is most certainly a prospect for a used car and is, perhaps, looking over the want ad columns of the local papers every night trying to find something of the right price and kind. This being the case, it would be well worth the trouble for any automobile salesman to do some personal, house-to-house soliciting in such sections in a hunt for prospects. And it would also be worth while talking to the neighborhood grocers and druggists as they are in constant, close touch with the folks of the neighborhood and know which people have cars, which want cars and which have money enough to buy cars if they want them. Try a little intensive solicitation in such a neighborhood and see how profitable it is.

## Camping Outfits Bring Profit to Dealer

In the small cities of the middle west practically everyone who takes a motor camping trip orders his camping equipment from a mail order house or motors to the nearest large city to make his purchase. A dealer in one of these communities bought a complete outfit one spring for his own use and as it arrived sometime before he was ready to use it, he put it on display in his salesroom. By the time he was ready to start he had sold four other outfits. As it was cash business and the goods were delivered as soon as they arrived he was able to make a nice profit and still sell at a very reasonable price.

## A Forge as Means of Giving Instant Service

A forge is often very handy in the shop but in many places it is not to be found and the mechanics could not use it intelligently if they had it. A shop owner who graduated from the school of practical experience as an apprentice in a blacksmith shop finds his forge one of his best paying investments. He makes extra heavy springs for cars that are being used on extremely hard service such as trucking. He also has a nice business built up among the orphan car users as he can give them almost instant service. He buys old springs at the junk yards and uses them in making his new products. As he can fit out any car on short notice and has but little money invested in stock his profits are very satisfactory. His service draws much other work and proves an excellent advertising medium.

## "Rent a Ford—Drive It Yourself"

J. Arthur Holsman, a Des Moines dealer in used cars, has developed the renting of Fords so that it is easy to engage an automobile for an hour or a day. This part of his business is operated under the name of the "Rent-a-Ford-and-drive-it-yourself" company. He states that it fills a much needed want among business firms whose cars are out of order, traveling salesmen who wish to visit a few customers without loss of time, doctors, collectors and others.

The operation of a service of this kind fits in well with the sale of used cars, and it is better to have a portion of one's stock engaged in productive work than to have the cars standing idle. And when cars are maintained in condition for instant service they are also in condition at all times for demonstrating with a view to possible sale.—Orin Crooker, Wheaton, Ill.

## Your Good Ideas—Are They Working?

*ONE idea in your own mind is one idea. That same idea given to other men through the Better Business Department of Motor Age becomes thousands of ideas.*

*Ideas help us all. They are the beginning of money-making plans. The smallest good thought may lead to a big result. Just as you are getting the good ideas of others through this department, give them a chance to get square with you by using one of yours. For the trouble of writing the idea Motor Age will send you ONE DOLLAR.*

## "Which Kind of Work Are You Paying For"

Many progressive service stations use revolving wire brushes to remove carbon from cylinder heads, from valves and pistons. To acquaint the public with the quality and economy of this method an Iowa dealer placed samples of his work in the window by the side of a hand-scraped job. A card which was hung over each job explained the time required in each case. A card in front of the display carried the following words, "Which kind of work are you paying for?" Many people came in to inquire about the machine and were taken to the shop and allowed to see it in action.

## Three Days Trial Sells Used Cars

The Olsen-Warren Motor Co., Seattle, has been selling its used cars this year on three days' trial and has found the plan has worked out very satisfactorily. Purchasers make a deposit on a car that on the surface is to their liking but if they are not thoroughly pleased at any time within three days the deposit is refunded.

## Adopts Fighting Slogan In Its Business

Folks always like to deal with concerns that are right up to the minute and that are live wires. The Pennell Auto Co., of Fort Wayne, Ind., dealer in Ford cars, realizes this fact and has painted the show windows and main entrance: "1921 Will Reward Fighters." The slogan is so big that everyone who passes the establishment cannot fail to see it and to be impressed with the idea that this concern is an up and coming institution.

## Dealer Identifies Patches He Puts On

Owners often forget just who put on each patch and blame a bad one on an innocent party. A dealer in southern Iowa who was trying to build up a reputation on his work had several jobs returned that he had not done, so had some paper patches printed. He placed these between the tube and the vulcanizer so their message was printed on the patch. In this way he got some cheap advertising and his work was identified for some time.

## The Contractor's Business Requires a Car

Contractors are particularly good automobile prospects because they have to be out at all times of the year visiting the work that they have in progress. Often they have to run from one railroad station to another and even from one town to another to trace a railroad shipment of building material of some kind. Again, they may make a tour of the surrounding country looking for gravel pits, sand banks, lumber stands, or similar sources of material.

Every contractor who hasn't a closed automobile should be a sure prospect for one this winter.

Get a list of all the contractors and builders in your locality and call on them systematically, one by one. Don't make only one call, but solicit each one again and again, until you either have sold him or are absolutely sure that he can't be sold a new car at this time. Expand your sales to contractors.—General Motors Acceptance Corp.

## He Fits His Used Cars With Speedster Bodies

Many small establishments have had more or less experience in converting used cars into speedsters. In most cases the body which can be built with their equipment is not quite distinctive enough to appeal to the best trade. At present several firms are bringing out speedster bodies that can be fitted to almost any car. One dealer sold practically all his used cars and two new jobs this spring by fitting them up with classy speedster bodies.

## How He Sells Extension Spot Lights

Extension spotlights are a bit more costly than the ordinary type and are sometimes rather hard to sell. By using one on the night service car and carrying a new one along many demonstrations were made. In many cases the driver could have found his own trouble if he had had the light, so was not hard to sell, as he did not care to pay another service bill. There is no time to sell a thing like the time when a customer is badly in need of it.

## Keep in Touch With the Old Customer

It always pays to keep in touch with former customers. When the new year comes around it is certain that a percentage of the folks who purchased cars from you last year will be in the market for new cars this season and so every old customer should be solicited on this point. Also it is certain that some of the former customers will so have gained in prosperity that they will want two cars instead of one and the most prosperous ones should be solicited on this point. Also it is certain that some purchasers of low priced cars will be in the market for higher priced cars and so some sales work should also be done along this line. Don't just wait for old customers to patronize you again. Keep in close, constant touch with them. Don't be content with having made one sale to them in time gone by—get all their business now and in the years to come.


**174,422**

There are 174,222 Building and Construction Contractors in the United States.

Contractors have to be out in all weathers.

They need closed cars, and trucks are necessities for hauling their materials.

Call on every Contractor once a month at least until he buys.

## Cars Without Lights Tagged With Invitation

Very often a car with improper lights can be found in the streets of a city where the policemen are not particularly active only at times when they decide to have a little excitement. A dealer who was just starting up his place of business tagged every car he could find that was not lighted according to law. His tag explained the danger of a trip to the police court and suggested it would be much less expensive to drive in and let him fix them up according to Hoyle. His plan worked well and got him a lot of advertising and much business.

## Ability to Change Quickly Sells Cut Outs

Cutouts are comparatively easy to sell, but oftimes it is hard to detain a customer long enough to get one on and by the time he has time to have the work done he has decided to go elsewhere. A dealer made a number of sales by keeping an extra exhaust pipe fitted with a cutout so that a quick change could be made if a sale was made. This also was very convenient when business was rushing, as the pipe could be fitted out during slack time later on.

## What Some Dealers Do With Waste

Small losses in the shop often run into large sums during a year. Several Iowa dealers place a package of waste and a box of cotter keys in the car when starting a job. If any is left over it is placed in the tool box and the owner is generally pleased to find it when in need on a trip. In this way there is no question about the charging up of these two items. Many dealers would be surprised if they knew just how much they lost on waste and cotter keys in a year.

## Has Motormeters Ready to Be Put On

Many motormeter sales are lost because the customer is in a hurry and will not stop while the instrument is being installed. An Iowa dealer who carried a complete line of special nickel plated radiator caps installed motormeters on one of each type and landed many of his customers who were in a hurry for the motormeter and a new cap. He found that the twin sale was about as easy as either separately and was able to give rapid-fire service.

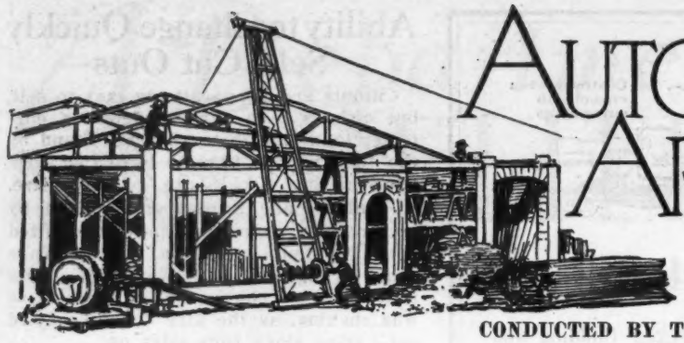
## Jacks Easier to Sell on Road Than at Home

J. Sherrat, Dodge dealer at Colfax, Iowa, is very successful in selling high grade jacks. When he gets a call to change a tire he always demonstrates his favorite jack. When the users see how easy it is with a real jack he is about half sold. According to Sherrat ten jacks can be sold on the road where one can be sold in the salesroom.

## An Idea That Makes Ideas Available Just When You Need Them

*ARE you getting full value out of this "Better Business Department" by preserving and classifying all the suggestions contained in this department? Why not secure a little indexed note book and clip out these items from week to week and paste them in this book in sections headed "Selling Cars," "Selling Service," "Better Service Ideas," "Publicity and Advertising," etc.? Then when any particular end of your business needed a little boosting all that you would need to do would be to refer to the right section of the book and there find a number of ideas which would enable you to boost the department successfully.*

*In this way all suggestions would be ready when needed and you would not have to rummage through back numbers to find the particular suggestion you had a hazy remembrance of. A clerk or stenographer could do this clipping and classifying in a few minutes of time each week.*



# AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

# Mixing and Applying Stucco

## *Various Processes Give Wide Range of Color and Surface for the Automotive Building*

*NOTE—From time to time it will be the purpose of this department to publish descriptions of the various building materials and processes employed in garage and service building construction. Stucco is rather popular just now and is really a good material when properly used. If any readers wish to ask questions along this line they will be cheerfully answered where possible.*

GIVEN the surface upon which to apply stucco, what is the proper course to pursue in mixing the materials?

We will not consider any of the prepared stuccos that are on the market as their makers issue instructions for mixing and applying them which must be followed for the best results. The best stucco for exterior use is made from Portland cement. Mixed with good clean torpedo sand in varying proportions it makes a hard, weatherproof surface that will last longer than it will ever be needed. When applied on a solid surface such as hollow tile, brick, stone or cement blocks no binding material, such as fibre or hair, is needed and at all times or wherever possible such binding material should be left out in exterior work. Fibre especially makes a passage for moisture which eventually tends to disintegrate the stucco.

Pure cement mortar is very hard to handle, however, and only an expert can make it hang on lathe without some sort of binding. Lime has been introduced as an ingredient into cement mortar to make it "fat," as the masons say. Cement mortar, especially, if low in cement is very "short" or crumbly, and it is difficult to make it adhere, but if a little lime putty is mixed in it becomes quite plastic or "fat" and stays where it is put much better. For this reason it is hard to get masons to use pure cement mortar. They will frequently recommend lime for mortar, claiming that it will last longer than cement when it is in reality only their prejudice against the cement because it is so hard to apply. It must be admitted that lime makes a better colored stucco than cement, the cement running to grays tinted all the way from grayish to greenish and brownish shades, while lime adds whiteness. A very good guess as to the amount of lime contained in stucco can be made by comparing its whiteness with a known pure cement job.

Always wet wood lath thoroughly before applying cement stucco. Also thoroughly wet hollow tile and porous brick but it must be understood that the wetting is for a different purpose in the brick and tile than in the wood lath. If the lath has not been wet previously, it will swell and crack off the tongue or key that holds the cement while the brick and tile will absorb all the water from the mortar, leaving it dry and powdery. Cement mortar, unlike lime mortar, needs the water it contains. The water does not dry out but forms a chemical combination with the cement which is the setting or hardening process. Lime, on the other hand, does not need its water, although it hardens better if kept damp. It first partially hardens into a pliable mass which gradually hardens as the hydrated lime absorbs carbonic acid gas from the atmosphere and turns into a carbonate or actual limestone.

In interiors the hardening of lime plasters can be speeded up by burning coke in salamanders in the rooms. These coke fires give off no injurious smoke but the great volume of carbonic acid gas attacks the moist lime plaster, and is absorbed and combined immediately. When applying cement stucco on hollow tile or brick it is a good plan to apply a thin coat of pretty rich mixture. This will make the wall waterproof. The same treatment on the inside where the walls could be finished with lime plaster. prevents effervescence or "saltpeter" stains as they are commonly called. These stains are caused by the soluble salts contained in the brick or tile coming to the surface and crystallizing.

If the surface is covered by a waterproof coating these salts cannot get out and consequently cannot stain the interior finish. A rich first coat on the outside will help keep out the dampness that would ordinarily be absorbed from a beating rain. Stuccos with gypsum base commonly called plaster paris are not to be recommended for exterior use. They are not very weatherproof, absorb moisture vigorously, and disintegrate from frost easily. These gypsum plasters naturally set too rapidly for practical use and all contain ingredients to slow up their setting properties called retarders. These retarders are usually a detriment rather than a benefit to the weatherproofness of the plaster.

There is a new type of stucco that has recently been used to quite an extent in

*Automotive Architecture*

**IN THIS department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity.**

**When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:**

**Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.**

**What departments are to be operated, and how large it is expected they will be.**

**Number of cars on the sales floor.**

**Number of cars it is expected to garage.**

**Number of men employed in repairshop.**

**And how much of an accessory department is anticipated.**

some sections. Its base is fused magnesite and instead of being mixed with water it is mixed with an exactly proportioned solution of either magnesium chloride or calcium chloride. The properties and ingredients of these stuccos are all secrets of the makers and the two parts come all ready to mix and apply. They make a very hard slightly flexible and consequently non-cracking wall and are especially valuable over frame. Some of them will not stand continued moisture but as a rule they are weatherproof. The finish of the surface of stucco is the only step in the process that the casual observer ever knows about, but here is a chance for unlimited effects in colors and surfacing.

Enumerating a few will perhaps not be out of place: Very smooth surfaces obtained by troweling with steel trowels. Sand float or fine grained surface—by using fine sifted sand in the final surface and finishing with wood or cork float or trowel. Coarser surfaces by using coarser sand, even small pebbles. The floated surfaces are all finished after the mortar has partially set. Very rough surfaces made by spattering very thin mortar on the wall with a paddle made of a shingle. Dry gravel, crushed stone, marble or other fancy material is sometimes thrown or pressed upon the mortar just after it is applied and is still soft.

### DIFFICULT TO KEEP SAME SHADE IN COLORING

Stuccos are often colored by mineral pigments like red iron oxide, yellow ochre, etc., but it is hard to match up batches and a patchy job results. It is best to measure or weigh out the ingredients very carefully if this is done and have enough color to finish the job, as another lot may be ground finer and thus stronger. A very attractive finish is obtained by scrubbing the wall when it is partially set but this is difficult as the proper time sometimes happens to be in the middle of the night and it cannot be gaged very accurately because temperature controls the setting to a great extent, heat hastening it. The same attractive results may be obtained by washing down with muriatic acid if the plaster gets too hard to yield to brush and water.

The beauty of these last methods is that they bring out the color of the gravel or sand used so that it is possible by using green or red sands to get these colors in a wall, or in panels, borders, etc. A pure white ((creamy white) stucco can be made from crushed white marble mixed with white Portland cement. Lime would make it whiter, but it would not be so permanent.

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### GARAGE IN RESIDENCE DISTRICT NO. 322

My lot is 120 ft. by 120 ft., one side on Grand Avenue Boulevard, and the other on a small side street. I am prepared to erect a building, approximately 50 by 100 ft., but I expect to use columns instead of trusses, for my roof supports. I realize these are very objectionable, but I will be compelled to cut the size of my building a great deal if I am to put my money in the trusses. I want to put up a very plain but artistic front as my garage is in one of Milwaukee's most exclusive residence districts, where all the homes are very artistic, and I want my building to be in keeping with the neighborhood.

For the reason that it is expected to restrict all buildings facing the boulevard, to residences, I must build the long side of my building to the front, facing Grand Avenue.

I want the corner to the northeast for accessories, office, etc., a ladies' restroom, toilet and the shop next to the accessories. A small stockroom and men's toilet should be provided for. I want the shop to have a capacity of six cars and a washrack should be provided at the west end of the building. The storage space is the least important as most of the present homes have private garages. I expect to carry a full line of tires and accessories and want plenty of window display space. The building will be set back 10 ft. from the curb.—The Woodland Garage, Wauwatosa, Wis.

Columns are not such an objectionable feature in a service station such as you plan to build. Of course, they are always better eliminated but the public storage garage is the only place that really suffers from their use.

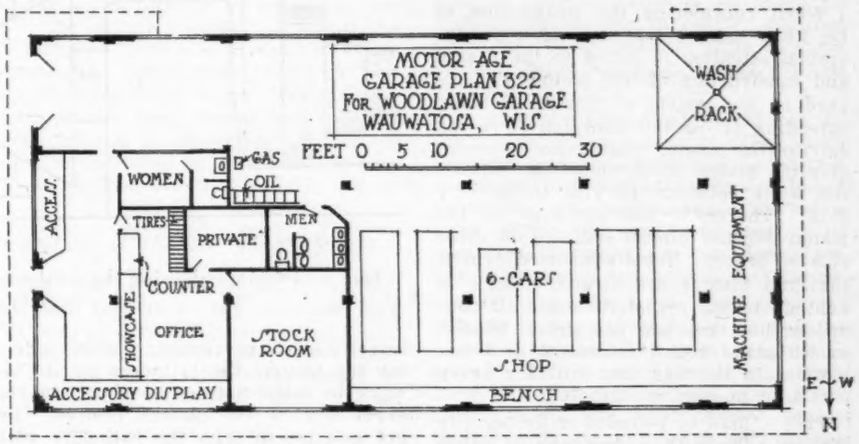
If you want this building to look well in a residence district without costing too much, we suggest that you build it along the lines suggested in our sketch with stucco and full timber, the timbers being left in the rough and stained an attractive brown or green. These timbers, of course, form the framework of the buliding which would be built in the mill type of construction. The stucco would be supported on lighter framework built between the timbers.

The broad overhanging eaves will give distinction to the building and the dormers, while adding to the appearance, will throw light over into the center of the floor.

A little shrubbery planted around the north and west side will also add a pleasing touch.


## Building in Exclusive Residence District to Harmonize with Surroundings

**An attractive yet inexpensive building could be erected along the lines suggested in the above sketch. Stucco and full timber is used. A quaint effect could be obtained by leaving the timbers rough and staining brown or green. Shrubbery planted around the building would complete its welcome in a residential district. When building in a neighborhood of homes an automotive building planned to harmonize is an important aid to the patronage of the community**

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## Ramp for Ford Cars

We are making an approximate estimate of cost on a three-story garage in which the architect has incorporated two ramps or inclines from first to second and from second to third floors. This garage is to be used for Ford cars and cars to travel up under their own power. What is the greatest percentage of grade a Ford will travel with safety? Name some instances where ramps are being used successfully and the grade used. Will a Ford travel a steeper grade than is ordinarily incorporated in garages?—E. J. Landor, Canton, Ohio.

If the ramp is for public use it would be best to keep the grade between 15 per cent and 20 per cent, but there is practically no grade too steep for a Ford to climb, providing it has traction. Danger is with the driver, rather than the car, and we usually recommend 15 per cent as being a practical grade for ramps.

# The Readers' Clearing House
## Questions and Answers

CONDUCTED BY ROY E. BERG
*Technical Editor, Motor Age.*

# Fitting Light Weight Pistons

Q —When fitting De Luxe light weight pistons would it be all right to get them the same size as the cylinder bore and lap them in with valve grinding compound?—A. Reader, Lincoln, Montana.

When considering the installation of De Luxe light weight cast iron pistons special attention is called to the design and construction of this piston with regard to the system of ribs or webbing extending across the head and down the skirt of the piston. These ribs or braces give the piston its strength and permits the walls between the ribs to be very thin. Therefore, the strength of the piston depends almost entirely on these ribs or braces. Tests conducted proved that the pistons are strong enough to hold up in the cylinders under all conditions but they are not strong enough to withstand rough treatment or being handled in the way that ordinary heavy cast iron pistons are handled.

They cannot be pounded or driven into the cylinder with a hammer or other tool nor can they be squeezed in a chuck of a lathe. The semi-finished piston is about 1/16 oversize with the center left on the head, the ring grooves finished, the pin holes bored a few thousandths undersize to permit reaming out in fitting wrist pins, since the wrist pins often vary somewhat from standard. In turning down from the semi-finished to the size desired, a 60 deg. cone should be used with a flat driving dog or tang between the piston bosses for turning. Any other method might force the piston out of round or out of true with the core.

Above all do not file a slot in the skirt for turning. Fig. 1 shows clearly what is meant and better results can be obtained by working from the bottom of the skirt to the head of the piston rather than from the head of the piston to the bottom. In no case should the center be ground off the head until the piston is finished otherwise, as with the center ground off, it cannot again be centered. Be sure the cylinders are in good condition before installing the pistons. If the cylinders are out of round, out of true, worn or tapered they should be reground or rebored. It is impossible to get an absolutely round cylinder by lapping because the bore at the port subject to ring travel wears about .001 in. per thousand miles on the average and is larger than the cylinder neck.

Much of the oil trouble is caused by fitting pistons into cylinders where ring travel wear is perceptible. When ordering the pistons the cylinders should always be micrometered to ascertain the exact size of the pistons desired. Do not attempt to lapp the cylinders with the new pistons as the walls are too thin to stand it. In some cases the pistons have failed because of an attempt of this kind. The Clark-Turner Co. offers the following recommended clearances which have been found satisfactory under average conditions.

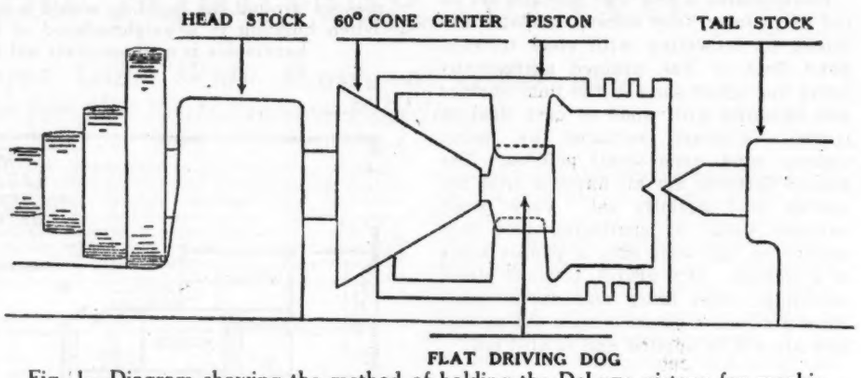


Fig. 1—Diagram showing the method of holding the DeLuxe pistons for machining purposes

| Diameter of piston. | Clearance. |
|---|---|
| 2 13/16 or under | .0015 |
| 2⅞ to 3 | .002 |
| 3⅛ to 3¾ | .0025 |
| 3⅞ to 4¼ | .003 |
| 4 5/16 to 4⅞ | .0035 |
| 5 to 5½ | .004 |
| 5¾ to 6 | .0045 |
| 6¼ to 6¾ | .005 |
| 7 to 8 | .006 |

For Ford engine allow .003.

The pistons can be fitted slightly closer than given in the above table if care is used in driving the first 500 miles. Such precaution is advisable in any case. It also helps a great deal to add lubricating oil to the gasoline for the first several hundred miles in the proportion of about one quart of oil to five gallons of gasoline. Be careful not to fit the piston pins too tight. The rings will have to be lapped in and the first operation is to fit the rings to the piston.

Examine the groove in which the ring is to work to see that the edges are sharp and the sides square. Try the ring in the groove. It should fit very tight or it would be better if it was too wide to get into the groove. The ring should then be lapped in so as to fit the groove perfectly. This can be accomplished by placing a little abrasive compound on a smooth piece of glass and working the ring back and forth.

After a small amount of metal has been removed in this manner the ring should be cleaned and tried in the groove. After all of the rings have been perfectly fitted into their grooves they should be lapped to a perfect fit in the cylinder. Place the cylinder block on an engine stand or a bench in such a position that it will be possible to work a piston through the entire length of the cylinder. It might preferably be placed in a vertical position.

If the engine has a removable cylinder head it should be taken off. Spring the rings into their proper grooves but in

### *The Readers' Clearing House*

*THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.*

*In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.*

so doing they should not be expanded any more than is absolutely necessary to get them in place. Fit the connecting rod and wrist pin and plug up all oil holes to prevent any of the abrasive from getting into them. Place a piece of wood in the crankpin end of the connecting rod to form a handle. Take a small amount of compound and smear a thin, uniform coating over the cylinder wall. Insert the piston with rings mounted and work it back and forth through the entire length of the cylinder, giving the piston about ⅛ of a turn every other stroke.

After enough strokes have been completed to turn the piston one complete revolution, remove it and clean thoroughly with gasoline or kerosene. Be careful not to get any of the abrasive on the wrist pin or any of the bearings. After all parts have been cleaned a test as to the fit can be made with Prussian blue. Smear a thin uniform coating of the blue on the cylinder walls. Insert the piston and work it back and forth, giving about ¼ turn after each stroke. Remove the piston and examine the rings carefully.

If a good fit has been obtained the entire circumference of each ring will show a trace of the blue. The abrasive compound to be used for a job of this kind ought to be purchased because there are many compounds on the market that can be purchased at low cost that will give highly satisfactory results. An attempt to make a compound almost always results in getting a non-uniform mixture that will not give good results.

### FITTING PISTONS

Q—Give the operation of lapping in Ford pistons. The engine has never been rebored.—W. C. Stoffer, Laporte, Ind.

Before taking any steps toward the installation of new pistons and rings the cylinder should be carefully micrometered. In most cases where conditions warrant the installation of new pistons the cylinders will be found badly worn and out of round. It is impossible to get an absolutely round cylinder with the lapping process because of the wear resulting from ring travel. The only means of obtaining a true bore is to regrind or rebore the cylinder block. Much of the oil pumping trouble is a result of fitting pistons and rings when there is perceptible ring travel wear. The question of fitting the rings after a true bore has been obtained is answered fully in the question answered on the preceding page for fitting pistons.

## Clearance of Ford Oversize Piston Rings

Q—How much clearance should be allowed in fitting new oversize piston rings in a Ford engine?

2—What is the firing order of a Cole 1918 "8" engine?

3—Publish explanation of valve timing of Chalmers 1918 engine.—A Subscriber, Hutchinson, Minn.

1—Ford piston rings are cut .002 taper and therefore it is essential that they be installed in the proper position. The rings should be placed with the file or punch mark up as shown in Fig. 2. The new rings should be placed in the cylinder and tried for gap with a thickness gage as shown in Fig. 3. The top ring should be given not less than .004 nor more than .008. The center ring may go as high as .012, while the bottom or oil ring may have as high as .016, since it is necessary that a small amount of oil work up between the piston and cylinder walls. If the gap is too small the ring should be filed until the proper gap is obtained. In badly worn cylinders it is sometimes necessary to file an oversize ring to fit the cylinder. Care should be taken in gaging the ring that it is not forced out of shape, as it is possible in this way to get a larger gap measurement than the ring actually has.

2—The firing order of the 1918 Cole is: 1-8-3-6-4-5-2-7.

3—Valve timing is laid out on the rim of the flywheel. To accurately check valve timing a feeler gage with .003 in. and .006 in. blades is essential. Turn engine until No. 1 (front) cylinder is on compression stroke, then, back of cams operating No. 1 inlet and exhaust valve are toward push rod roller.

If gear is off camshaft, turn shaft until inlet valve closes, then give camshaft 1-3 turn in rotating direction when back of cam will be toward tappet roller. Adjust both tappets so .006 in. feeler gage can just be removed from between push rod adjusting screw and valve stem. Turn shaft until inlet valve starts to open, back up shaft and insert .003 in.

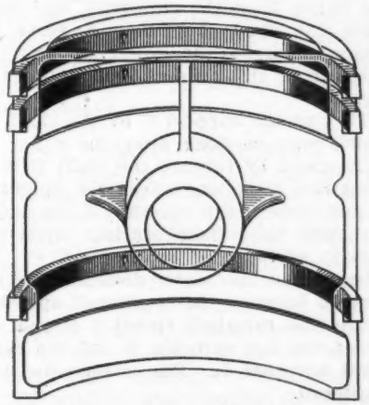


Fig. 2—Diagram showing the correct way of installing the Ford oversize piston rings

feeler gage between valve tappet and valve stem, then turn shaft forward again until gage can just be removed. Turn engine until markings on flywheel "1-6-IN-O" is in center of opening above flywheel and apply cam gear with engine and camshaft in above position.

After tightening gear in position, back flywheel up a few inches, then come ahead slowly, moving feeler gage while turning engine. At time adjusting nut tightens on .003 in. feeler gage, mark on flywheel should be in center of open-in flywheel housing. Do not confuse opening and closing of clearance gap between push rod and valve stem with opening and closing of valve. Valves open at time clearance is all taken up with engine moving in regular rotating direction. Check exhaust valve in same manner, using marking "1-6-Ex. C1" on flywheel.

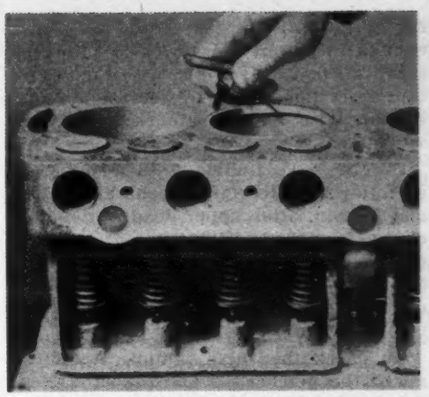


Fig. 3—Using the feeler gage to measure the piston ring gap

If found necessary, all valves can be checked in this manner. If valve opens early or late, cam gear can be shifted on camshaft flange to limits of slotted holes for cam gear bolts or shifted a tooth either way on crank gear. In case this is necessary, new dowel pin hole must be drilled in gear and flange.

After checking valve timing, adjust tappets to .003 in. clearance on back of cam for running allowance. An allowance of ¾ in. is permissible either way from mark on flywheel for opening or closing of valves. When checking valve timing to the marks on flywheel, always check by turning engine up to mark in regular rotating direction. Do not back engine up to mark, as clearance in gears will cause variation.

Inlet valve opens on top dead center. Inlet valve closes 50 deg. (6 19-32 in.) past low dead center. Exhaust valve opens 50 deg. (6 19-32 in.) ahead of low center. Exhaust valve closes 10 deg. (1 15-32 in.) past top dead center.

### REO VALVE TIMING

Q—What can be done to remedy loading up on a 1915 model Reo 5 when pulling steep grades or at idling? It is equipped with a model R Schebler carbureter.

2—Give valve timing of this car. Would advancing or retarding valve timing benefit loading up?

3—Publish power curve of this car.—Buhr Bros. (J. E. Buhr), Casco, Wis.

1—Loading up when the engine is idling or when it is pulling under heavy load is probably the result of condensation in the manifold and leaky valves. If it is possible to shorten the intake manifold it would help the operation a great deal. In addition it would be a good idea to install a hot spot such as the Losee protecto meter manufactured at Hebron, Ill. Examine the manifold and carbureter connections to see that no air is being admitted.

If it is found impossible to get smooth running at idling speed by a careful adjustment of the carbureter the valves may be leaking. Very often the valves

set very well, but the stems are worn enough to permit the valves to spin and admit a great deal of air, with the result that it is impossible to get smooth operation with any kind of a carbureter adjustment.

2—The valve timing of this engine is as follows: Inlet valve opens at 17 deg. and 76 min. after upper dead center and closes 36 deg. and 42 min. after lower dead center. The exhaust valves open 53 deg. and 30 min. before bottom dead center and close 14 deg. and 21 min. after top dead center.

To check the valve timing, first open all of the petcocks over exhaust valves. Starting with the intake valve of cylinder No. 1, turn the flywheel slowly until the marks U. D. C. 1 and 4 is nearly on a line with reference point on cylinder. You will note a short distance from this the mark I. O.; bring this in line with the reference point on the cylinder, at the same time watching or feeling the inlet valve stem to determine the point at which it commences to open or is lifted from its seat. Having determined the opening point and checked it with the mark on the flywheel, determine its closing point by turning the wheel until mark I. C. 1 and 4 is in close proximity to the reference point.

Slowly turning the flywheel, determine the exact point at which the inlet valve closes and check with the markings on the wheel. In a similar way the exhaust valve of No. 1 cylinder can be checked with the marks given. Fig. 4 shows markings on the flywheel and the reference point for the valve timing. A variation not to exceed ¼ in. either way from the reference point is allowable. The valve timing would not be a logical cause for the loading condition in the manifold. It would be advisable, however, to make a check of the ignition system to be sure that a sufficiently strong spark is being produced to give good combustion.

## 1915 Reo Valve Timing

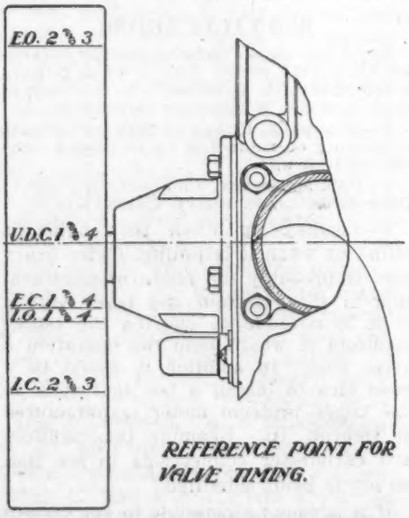



Fig. 4—Diagram showing the markings on the flywheel to be used in checking the valve timing of the 1915 Reo engine

3—A power curve of this engine is not available, but it is rated at about 35 hp.

### CADILLAC CHAIN ADJUSTMENT

Q—What company manufactured the Cadillac chain adjustment? By what company are the patents controlled?

2—Give adjustment of the Cadillac 1921 timing chain.—A. E. Ferrar, New York.

1—This chain adjustment is manufactured by the Cadillac Motor Car Co. The patents on this chain adjustment are controlled by the Morse Chain Co., Ithaca, N. Y.

2—The frequency with which adjustment is necessary depends upon four things:

Use of suitable lubricant
Manipulation of carbureter enriching lever
Replacement of engine oil
Washing out of oil pan of engine

To determine if chain adjustment is necessary oscillate the fan as far as possible without slipping the fan clutch. If the movement at the periphery of the fan exceeds 1 in., adjustment is recommended. Under no conditions should the car be driven until a readjustment is made if the fan movement exceeds 2 in. See Fig. 5.

Camshaft sprockets N and L are not integral nor do they bear upon the camshaft as in earlier eight cylinder construction. The camshaft sprockets have their bearings and rotate upon eccentric surfaces H and F of the support C. The support C is clamped into the crankcase by the locking collar A. The camshaft J rotates in bearings carried in the support C.

Shafts E and B fitted with worm gears I and G meshing with teeth cut upon the flange D of the support C and with teeth cut upon the collar A serve as means whereby the collar A may be loosened or tightened and the support C turned.

Turning the support C by the shaft E, which may be done after the collar A is loosened by turning the shaft B in a clockwise direction, raises the sprocket N and lowers the sprocket L, as these sprockets have their bearings upon eccentric surfaces of the support C. In other words, the center distances are increased between the crankshaft sprocket T and the camshaft sprocket N and between the fan sprocket S and the camshaft sprocket L. The chains are thus tightened.

Camshaft sprocket N is driven from the crankshaft sprocket T by the chain K. Camshaft sprocket L is driven from camshaft sprocket N by a universal cross M through lugs on the inner surfaces of these sprockets. Camshaft J is driven by camshaft sprocket N through the universal cross I and the driver P. The camshaft sprocket S is driven from the camshaft sprocket L by the chain R.

To adjust turn the shaft B six complete revolutions in the clockwise direction. This will loosen the locking collar A screwed onto the inner end of the support C. Turn the shaft E in the clockwise direction sufficiently to reduce the movement at the periphery of the fan to ⅜ in. without slipping the clutch at the fan hub. Then turn the shaft B in the counter clockwise direction, thereby clamping the support C into place.

When chains become so badly worn that readjustment cannot be made, remove the offset link of each chain. Then loosen the locking collar A by turning the shaft B six complete revolutions. Turn the shaft E in the clockwise direction, bringing the sprockets L and N into positions such that the chains can be replaced. Then adjust the chains as directed. Chains must always be replaced in pairs. Do not replace one chain only.

### NATIONAL SEXTET ENGINE

In the February 24 issue of MOTOR AGE on page 39 there appeared a view of the National engine. This engine is not the National Sextet engine but the engine used just previous to the time of the adoption of the Sextet engine. Fig. 6 shows a sectional view of the engine now used. This engine is an overhead valve job 3½ by 5¼ in. bore and stroke rated at 29.4 hp. The maximum hp. is 71 and is obtained at 2600 r.p.m. A removable head is provided and the cylinders are cast en bloc. The lubrication system is full pressure feed.

### BODY BUILDING

Q—Explain how fenders, body sheets and corner panels are formed?

2—How are the above applied to bodies? —W. L. Vanatta, Hunts Spur, Michigan.

1-2—We believe that all the information you might desire on this subject is explained and illustrated in this week's issue of MOTOR AGE. You will not there how the forming hammer is used to pound out the contour on the metal. It is a strange thing that most of the men operating these planishing hammers, are Finlanders and Laplanders. It seems that men of these nationalities are better able to stand the nervous strain that results from the excessive noise of the hammers.

## Adjustment of Timing Chain

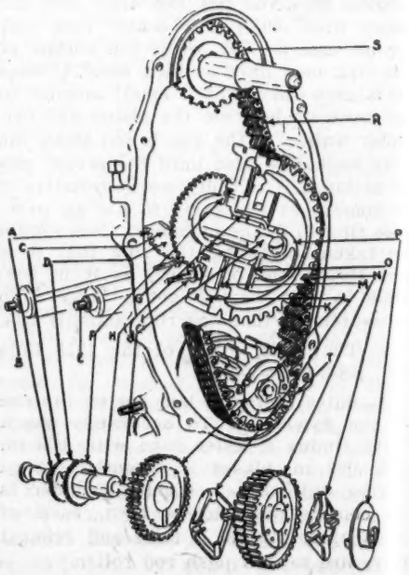



Fig. 5—Parts which are of importance in keeping the timing chain of the Cadillac 59 engine in proper adjustment

## *Cross Sectional View of the National Sextet Engine*

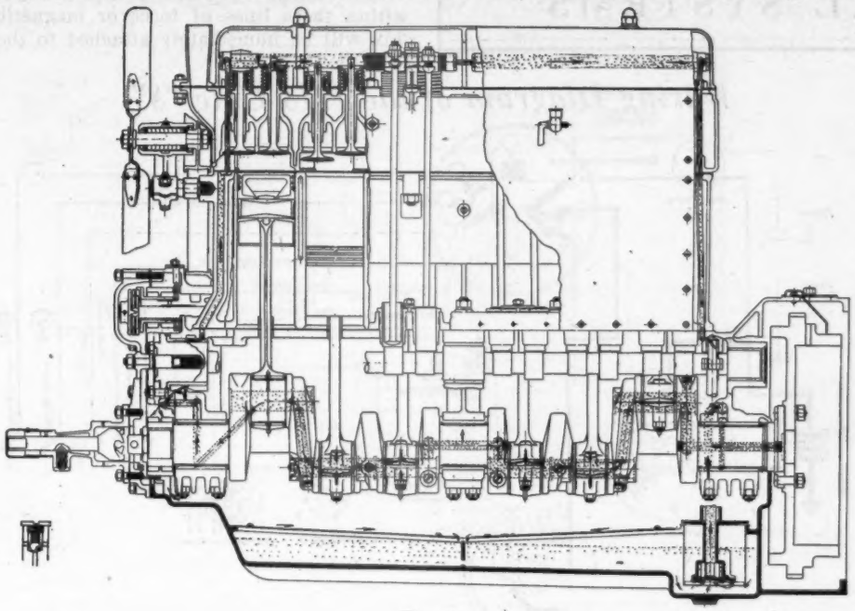


Fig. 6

# CARBURETION

### MANIFOLD LOADING

Q—A 1919 Hudson four-passenger car seems to "load up" badly in the manifold after a long, slow, hard pull so that it takes quite a while to clear. Explain how to remedy this trouble. Would some kind of a "hot spot" arrangement cure the trouble?—B. J. Perkinson, West & Wheeler, Seattle, Wash.

To remedy loading up of the intake passage after a long, hard pull check over carbureter, vacuum tank and primer. The carbureter packing gland shown in Fig. 7 should be properly tightened. A loose gland will result in a rich mixture being drawn into the intake manifold. Offset sticking of the carbureter piston by removing this assembly and polishing both piston and cylinder walls with a good grade of metal polish or a mixture of whiting and oil. Make sure when returning the assembly that the slot in the metering pin faces the engine. Examine the ball check valve located at the vacuum tank connection of vacuum line leading to the intake passage to see that it is seating properly.

A leaky float would also cause loading. See that the primer has been installed correctly. In some instances this assembly has been installed upside down, the ball check off its seat, allowing the gas to be drawn into the engine through the primer lines. A quick way of checking this point is to disconnect the line leading from the vacuum tank to the pump, offsetting the functioning of the primer.

A point which should always be recognized is that the driver must use due care in regulating the dash adjustments as lean as possible. Fig. 7 shows a sectional view of the Hudson carbureter with the points for inspection noted. To remove the piston and metering pin assembly, remove the screws from the top of the carbureter and lift the assembly out. Be sure that the cover joint is airtight when it is replaced.

A hot spot would undoubtedly give very satisfactory results and would assist in overcoming the trouble described. The Losee protecto meter manufactured at Hebron, Ill., has been tried out in various parts of the country with highly satisfactory results.

### HEATING THE FUEL

Q—A Model 79 Overland has just been overhauled and a new Bosch high tension magneto installed. Everything is apparently in good shape, but the engine will not operate smoothly. What is the reason, and what can be done to overcome the trouble?—Sanford Yager, Sulphur, Ky.

If the ignition system is functioning properly the trouble must be due to loading in the manifold. This car is a 1914 model and is provided with a long manifold without any heating arrangement. Due to the condition of the fuel being marketed at the present time it has become necessary to apply heat in some manner or other to get better conditions for combustion. In some cases the intake and exhaust manifolds are cast integral and in others all of the air entering the carbureter is heated by an exhaust stove.

In order to secure smooth operation at low speeds and when the engine is speeded up after a long, slow, hard pull it is essential to have properly applied heat. Operating conditions in your case could be greatly improved by installing a new manifold or by shortening the present one. A new carbureter can be installed to great advantage, and it would be a good idea to install a hot spot such as the Losee protecto meter manufactured at Hebron, Ill. If an attempt is made to shorten the present manifold the fuel feed system must be taken into consideration. Gravity feed is now used, and if a new manifold is installed it will probably be necessary to install a vacuum or pressure fuel feed system.

### GEAR RATIOS

Q—What are the gear ratios on low, intermediate and high gear in the Ford, Dodge, Chevrolet 490 and Overland 4?

2—Is there any damage done to the Ford magneto by running the car on the battery instead of the magneto?

3—How fast is the Ford car traveling on high when the engine is running 1000 r.p.m.?—E. R. Anderson, Herman, Minn.

1—Following is a table of gear ratios of both transmission and rear axles:

| | Low. | Intermediate. | High. | Reverse. | Rear Axle |
|---|---|---|---|---|---|
| Ford | 2.74 | | 1 | 4. | 3.636 |
| Dodge | 4.89 | 1.91 | 1 | 4.89 | 4.166 |
| Chevrolet 490 | 3.32 | 1.77 | 1 | 4.2 | 3.63 |
| Overland 4 | 3.62 | 2.03 | 1 | 4.83 | 4.5 |

2—No damage will result from running the engine with battery ignition, but we see no reason why this should be done unless an entirely new battery ignition is installed, in which case the magneto is not necessary.

3—When the Ford engine is running at a speed of 1000 r.p.m. the car ought to be traveling at the rate of very close to 25 m.p.h.

### REMOVING PUMP SHAFT

Q—Give instructions for removing the water pump shaft from the engine of the Monitor car.

In order to gain access to the pump shaft and make the removal of the parts easier, the front part of the body should be loosened by the removal of the bolts holding them. The universal joint can be disconnected and sectioned, which will make it possible to move the engine back far enough so that the front end can be lifted above the cross member of the frame. This will enable you to remove the timing gear housing and other parts necessary in removing the pump shaft. After the pump shaft gear has been removed the rest of the parts can be taken apart in rotative order and the shaft removed. The pump can be split and the impeller pulled, after which the pump can be taken off.

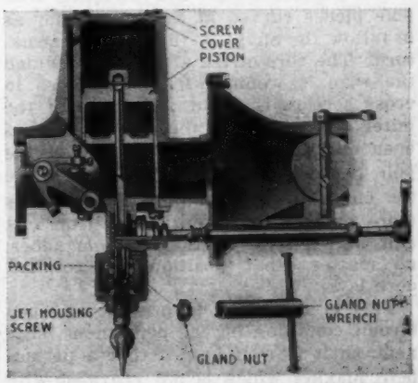



Fig. 7—Phantom view of the Hudson carbureter showing the important parts in connection with the adjustment of the carbureter

# ELECTRICAL SYSTEMS

## CHALMERS WIRING DIAGRAM

Q—Publish a wiring diagram of the 1915 Chalmers Models 26.

2—Should there be a spark from the two front terminals of the motor generator by making contact with a screw driver? If so, what is the cause?

1—A diagram of the lighting system was published in the Jan. 18 issue of MOTOR AGE. A diagram of the starting circuit and of the ignition system is shown in Fig. 9.

2—By referring to Fig. 9 you can see that the two front terminals of the motor generator are connected directly to the positive and negative terminals of the storage battery. Naturally, if you short the circuit the battery across these two terminals with a screw driver you will get a heavy spark.

## EISEMANN MAGNETO

Q—We have an armature out of a G-4 Eisemann magneto. This armature revolves in the lines of force put out by the horseshoe magnets. What breaks the lines of force, the side pole pieces or the coil of wire between the two pole pieces? If it is the coil, why must the armature be timed and the pole pieces placed about 1/32 in. from the sides of the magnets?

To answer your question specifically it will be necessary to state briefly what happens in a magneto which causes the secondary winding to produce a spark at the spark plug. Before proceeding with the explanation we wish to call your attention to the fact that the distance between the permanent magnets proper and the pole shoes over which they sit should be as little as possible and is rarely found to exceed .010 in. The engineering department of this magneto corporation has informed us that if the machine has a space between the pole pieces and the sides of the magnet equal to 1-32 in. such a machine should not have left the factory.

We are inclined to believe that the distance mentioned is not 1-32 in., although it may appear to be at the point where the magnets start to go over the pole piece housing. This magneto, roughly speaking, is composed of a permanent magnet of the U type, to the ends of which on the inside are attached iron pole pieces curved in such a manner as to follow the shape of the rotating armature. The core of the armature on which the wire is wound when cut across in cross section is about the shape of the letter I in which the top and bottom has been curved to follow the shape of the pole pieces. This is done so that while the engine is not running there will be more or less of a continuous iron circuit between the stationary pole shoes, no matter what position the rotating core is in.

This is necessary to prevent an open circuit condition on the permanent magnets, as it is well known that a permanent magnet which is not provided with some sort of a keeper will lose its magnetism rather fast.

This magnetism is composed of certain invisible lines of force, commonly called flux which has the power to do certain things. A piece of iron brought within these lines of force or magnetic flux will be immediately attached to the

## *Wiring Diagram of the 1918 Cole "8"*

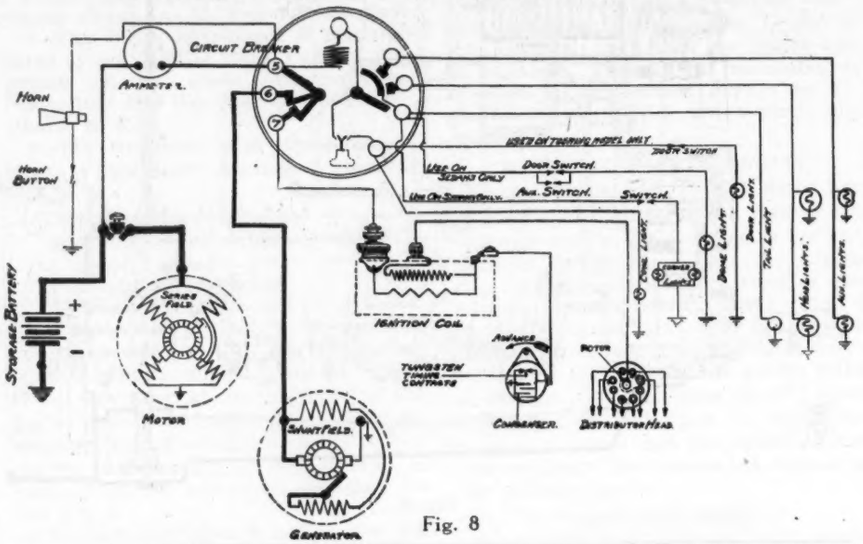
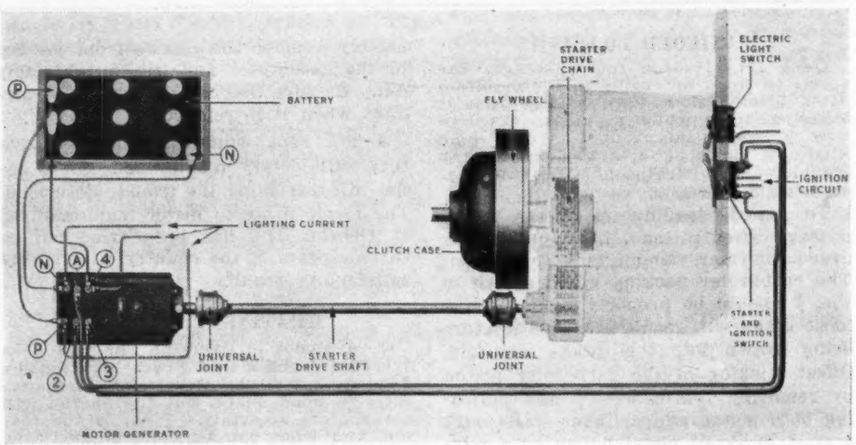



Fig. 8

## *Starting and Ignition of the 1916 Chalmers "26"*



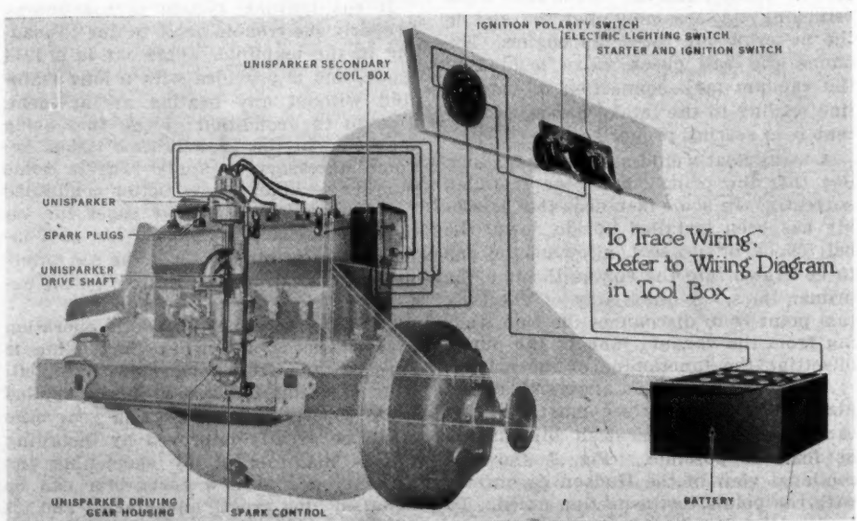




Fig. 9

## *Wiring Diagram of Haynes Coupe Model 47*

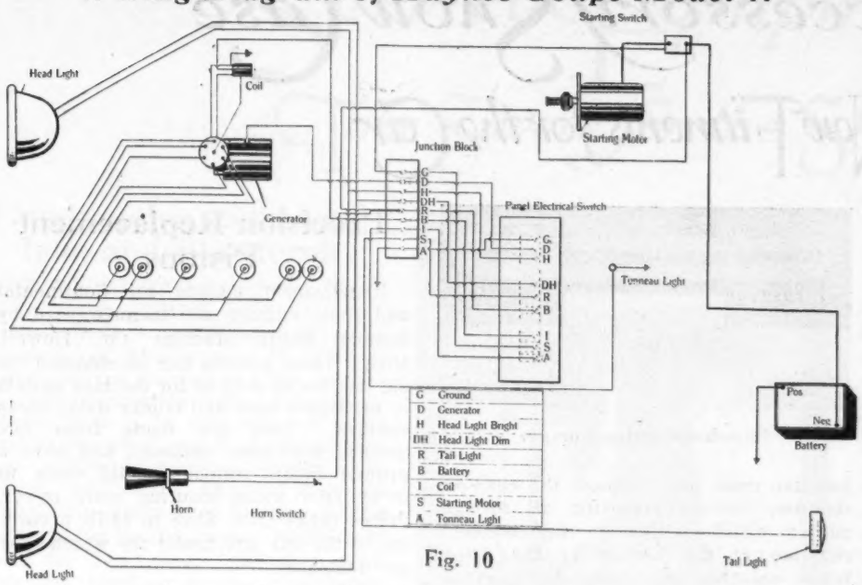



Fig. 10

## *Wiring of 1915 Overland Model 81*

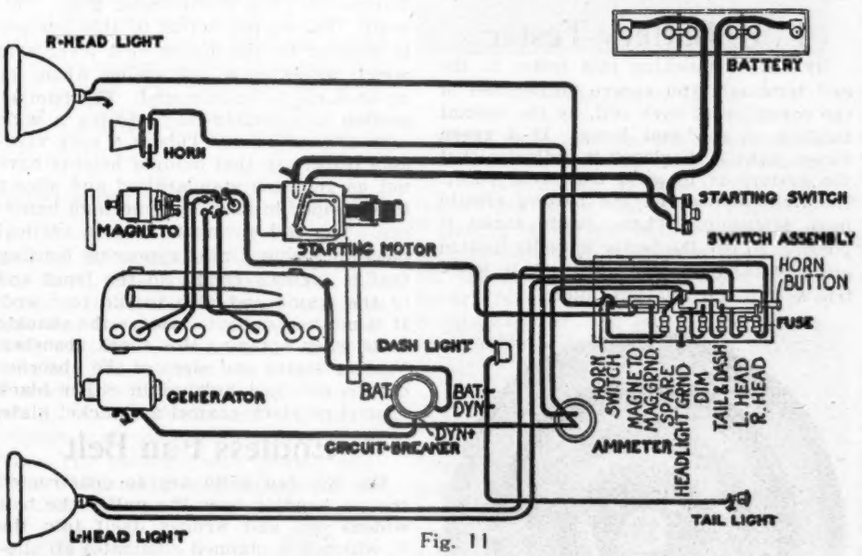



Fig. 11

magnet itself. If we take a loop of copper wire, and revolve it in this flux between the stationary pole shoes, electricity will be generated or will flow in the wire.

In this magneto copper wire is wound on the core mentioned above and connected in series with a set of contact points. The first winding is composed of a comparatively small number of turns of heavy wire and is commonly known as the primary winding. On top of this primary winding is wound a great many turns of very fine wire and is usually known as the secondary winding.

Magnetic flux always flows in one direction in the magnets. Now, if you will make a sketch of the magneto as described so far, and make the rotor so that it can be turned in the pole shoes, keeping in mind that the magnetic flux is always flowing in one direction, you will find this flux flows through the core first in one direction and then the other, alternating as long as the core is revolved. It is evident, therefore, that before the magnetic flux in the core can reverse itself, it must die down to zero and then build up again in the other direction.

This dying down of the flux in the core is the most important thing to keep in your mind as it is what really causes the induced spark in the secondary circuit. In other words, there is no change in voltage in the loop of wire revolving in the magnetic circuit unless there is a change in the magnetic flux, which, of course, there would be. The voltage in the primary winding is built up to its points of greatest voltage by this changing flux, at which point the contacts are opened and the flux in the revolving core dies down rapidly to zero, because at that moment, it is in a position between the stationary pole shoes such that the flux is about to change to the opposite direction.

This rapid dying away of the flux in the armature induces a current in the secondary which is proportional to the number of ampere turns between the primary and secondary. In other words, the dying away of the flux in the core is what actually produces the current in the secondary which in turn produces the spark at the spark plugs. The condenser is almost entirely for the purpose of keeping down the spark at the contact points, although it does have some slight effect on the strength of the spark at the spark plugs.

### HAYNES WIRING DIAGRAM

Q—Publish wiring diagram of a 1920 Haynes coupe, Model 47.—George W. Adams, New York.

The wiring diagram is shown in Fig. 10.

### COLE WIRING DIAGRAM

Q—Publish wiring diagram of the 1918 Cole "8."

See Fig. 8.

### 1915 OVERLAND 81 WIRING

Q—Publish wiring diagram of 1915 Overland, Model 81. — T. L. Hughes, Youngstown, Ohio.

1—The wiring diagram of the Overland 81 is shown in Fig. 11.

### RACE CAR WEIGHT

Q—What is the proper distribution of weight for a racing car for half-mile track work?

2—Is it desirable to swing the weight as low as possible or merely enough so car will slide rather than attempt to turn over?

3—Considering both cars properly balanced, is there an appreciable advantage on the turns with a car of short wheelbase, over one with a wheelbase of 120 inches? If so, how much can a 490 Chevrolet be shortened with good results?—W. P. Walsh, Walsh Motor Company, Rantoul, Illinois.

1—The ideal arrangement in a race car is to secure an exact balance on all four wheels. This is appreciated when the effect of centrifugal force is considered. If a car is heavy on the front end, the tendency will be when rounding a turn for the front end to fly out before the rear end does, or the effort at least will be greater. If we imagine a racing car as composed of a large elastic mass it is seen that in rounding a left hand turn the car would pile up on the front right wheel. Of course such a situation is a comical illustration, but this is exactly what happens to race cars on the Indianapolis track. Invariably the front right tires show more wear than any other tire of the car. Now if the weight is distributed more on the front than on the rear which would be the case with a short wheelbase car and the engine set well up toward the front as it would be in a rebuilt Chevrolet having its rear end stripped and lightened, the effect would be for the car to continually work toward the outer side of the track.

2—The weight should be fairly low. In fact the road clearance for dirt track racing cars should be about 4 or 5 in.

3—The wheelbase of the Chevrolet 490 is 102 in., which is about the same as used on most racing cars.

# The Accessory Show Case

## New Fitments for the Car

### Cabinet Toilet Set

Fitted out with a mirror, comb, shoe brush, clothes brush, soap, paper toweling and a compartment holding two gallons of water, this toilet set adds much to the convenience and enjoyment of making a trip. Every article is fitted to its place in the cabinet, making it rattle proof. Four small holes, through which bolts are run by which it is attached to the running board of the car, make it a matter of but a few seconds to either attach or detach it. It is white enameled on the inside and black enameled on the outside, making a very neat and attractive addition to any car. The cost is $13.75 and the manufacturers are Paulsen & Iwen, Inc., Denison, Iowa.

### Cushnsteel Wheels

Cushnsteel wheels are single disc, using a tapered disc, and are provided with quick detachable rims. The hub fastening, a wedge fit of the disc on the hub, relieves the strain on the fastening bolts and yet permits easy attachment and removal of the disc from the hub in changing tires, it is claimed. The peculiar construction of the rim connections, hub design and the shape of the disc offer a light weight assembly. Standard equipment consists of five disc wheels with rims, five hub caps for the axles and an extra hub cap for the spare wheel carrier. American Steel Foundries, 28 E. Jackson Boulevard, Chicago.

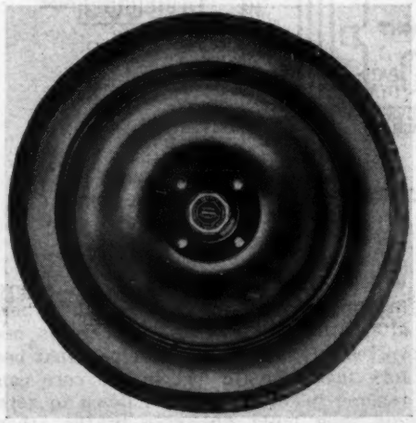
### Ro-Gas-Filter

A filter which is especially designed for cars with a vacuum feed system but which can be applied to any car has been placed on the market by The Roll Mfg. Co., Fond du Lac, Wis. It is so constructed that when the vacuum tank draws the gasoline from the tank, the gasoline must pass through the chamois strainer, thereby removing all foreign matter which settles in the sediment chamber at the bottom of the filter. When entering the filter the gasoline passes through four equally spaced holes dividing it equally against the strainer. The filter is cleaned by simply unscrewing the sediment chamber.

Ramshorn spring bumper

### F. B. Battery Tester

By simply touching this tester to the cell terminals you secure notification of the condition of each cell, by the instant lighting of a signal lamp. If a green signal light is displayed it indicates that the battery is in good condition, but if the light shows red the battery should have attention. These lights make it possible to use the tester in badly lighted and dark places. Price $15. F. B. Electric & Mfg. Co., Detroit, Mich.



Cushnsteel wheels

### Precision Replacement Pistons

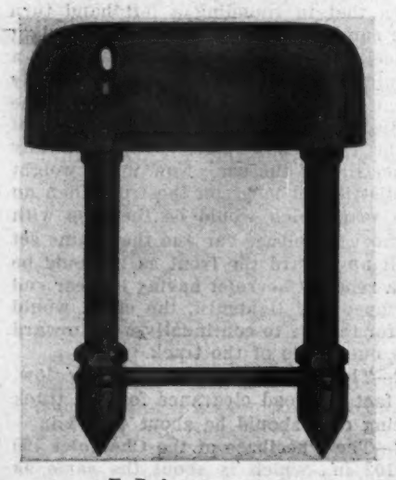
Replacement pistons for Continental and Buda engines are manufactured by Spencer-Smith Machine Co., Howell, Mich. These pistons can be obtained for old models as well as for the late models of passenger cars and trucks using these engines. They are made from fine grained semi-steel castings, and have a ground finish which permits close fit to cylinder walls, insuring more power. Prices range from $3.25 to $4.70, according to the car and model for which they are designed.

### Ramshorn Bumper

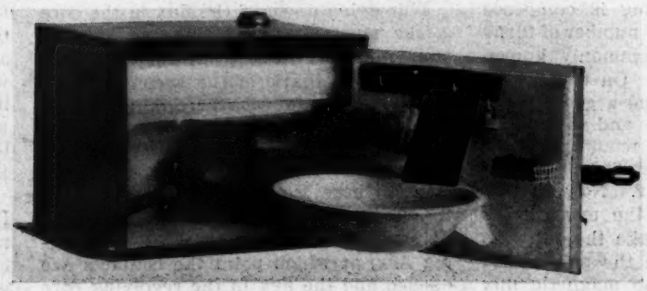
One of the most novel bumpers ever offered is that made by the Rams Spring Bumper Co., 920 Westminster Bldg., Chicago. The spring action of this bumper is secured by the action of a lever arm which winds up a coil spring whenever an obstacle is encountered. The bumper section is a double bar, offering a wide area of protection. This is a very valuable feature in that bumper heights have not as yet been standardized and allows this bumper to meet low and high bumpers. The coil spring is held in vertical position within a neat appearing housing that is secured rigidly to the front end of the frame and also to the rear end. It is not necessary to remove the shackle bolts when applying this shock absorber. Various styles and sizes of the absorber can be obtained finished in either black enamel or black enamel and nickel plate.

### Endless Fan Belt

Rie Nie fan belts are so constructed that in bending over the pulley the belt widens out and wedges itself into the V, which it is claimed eliminates all slippage. These belts are also claimed to be oil and water proof. Durkee-Atwood Co., Minneapolis.



F. B. battery tester



Cabinet toilet set

Gas filter

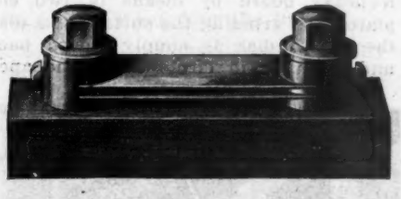
# Service Equipment
## Time Savers for the Shop

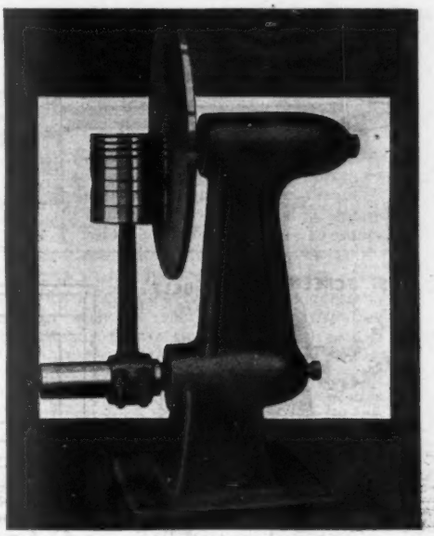
### Combination Soldering Iron and Blowtorch

This new invention, called the "Ever-Hot" can be changed instantly, it is claimed, from a soldering iron to a blowtorch, or vice versa. It operates on gasoline and consists of a No. 18 gage brass tube connecting with a pre-heating chamber by a ⅛ in. iron pipe. A small pump at the other end of the brass tube gives sufficient gasoline pressure to make a "cold" start. The gas is forced through the pre-heating chamber to the needle valve in the center which regulates the flow. Once started, a wick feeds the gasoline to the pre-heating chamber. The heat expands and vaporizes the gasoline which passes through the needle valve as it is used. The inside of the soldering point is hollow and punched with holes to allow the carbon to escape. This tool is light in weight and can be easily carried in a tool bag, and it is said will work in any wind, making it ideal for outdoor jobs. Distributed by Belfry & Craighead, Tribune Building, Chicago.

### American Piston Square

The American piston square is designed for the accurate alignment of pistons, wrist pins and connecting rods with the crankshaft. Being of generous proportion, the square will handle connecting rods from Ford size up to 22 in. in length. The castings are heat treated and seasoned. The disc and mandrel housings are machined and ground to extremely accurate alignment and parallelism. The hardened and ground mandrels seat instantly and solidly in the tapered housing, but quickly release with a slight hand blow on the knockout pin. The disc and spindle have adjustment to the piston face by means of a rapid thread lead screw and tobin bronze nut. Weighing 140 lb. and having a disc 16 in. in diameter, with a spindle bearing 52 sq. in. in area, the American piston square is an accurate special tool. It is manufactured and sold by the American Engine & Airplane Co., Los Angeles, Calif.





American piston square

### Rustsolvo

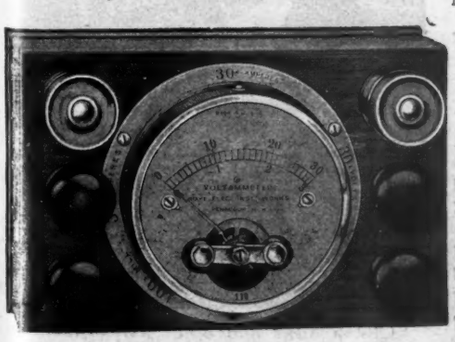
Rustsolvo is a free flowing fluid and non-inflammable. It is claimed to dissolve rust, lead, paint, tar, grease or dirt, and to cut carbon deposit, etc. When tearing down or taking apart a car the application of Rustsolvo will make the task much easier, as it will quickly loosen up parts and connections which are stuck from rust or carbon. It can also be used to good advantage on rear axle springs to reserve their resiliency. The Rust Products Co., 1026 Rand McNally Building, Chicago.

### Allen-Bradley Test Instrument

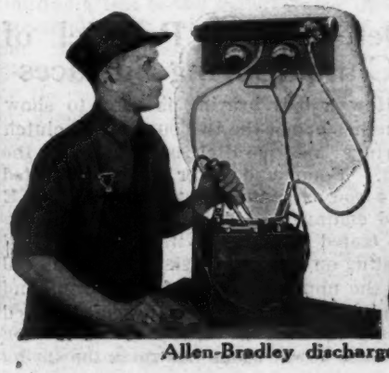
The Allen-Bradley Co., Milwaukee, is manufacturing a high rate discharge test set for storage batteries that has a particular application in every electrical service station and can be used generally by any service station doing any kind of battery or electrical work. The instrument may be mounted on the wall at a convenient height where the scale of the meter is in full and plain view of the operator. The basis of the Allen-Bradley tester is a graphite compression resister composed of a large number of graphite disks incased in an insulated steel housing. A hand wheel through a spring compression coupling applies pressure to the disks and thus regulates the ohmic resistance of the disks. By turning the hand wheel the current from the battery discharging through the carbon pile resistor can be varied from a very small discharge to a heavy current. The voltmeter which can be furnished if required and ammeter indicates exactly the condition of the battery. The company furnishes a large wall chart measuring 14 by 31 in. It is in colors which interpret all the battery readings that are obtained from batteries in various conditions.

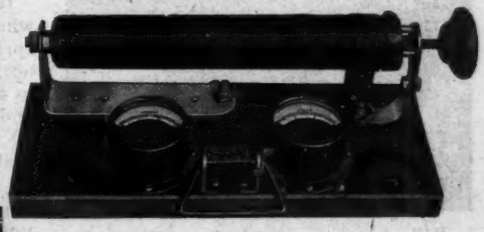
### Hoyt Rotary Meter

An extremely valuable meter for the man engaged in testing electrical equipment of the motor car is the Hoyt rotary meter made by the Hoyt Electrical Instrument Works, of Penacook, New Haven. The meter is a combined volt and ammeter. As a volt meter its capacity ranges from 90 millivolts to 30 volts and, as an ammeter from 3 to 30 amp. but with the shunt which can be had with the meter at a slight additional cost its capacity in amp. may be increased to 300 amp. The meter is constructed very sturdily, has an adjustable means to regulate the reading of the needle and is in every respect a precision instrument for accurate testing of electrical equipment on the motor car. The meter is equipped with a rotary swivel in its base that acts as safeguard should it be incorrectly connected in the circuit.



Hoyt rotary meter





Allen-Bradley discharge test set for storage batteries

# The Automotive Repair Shop

## Practical Maintenance Hints

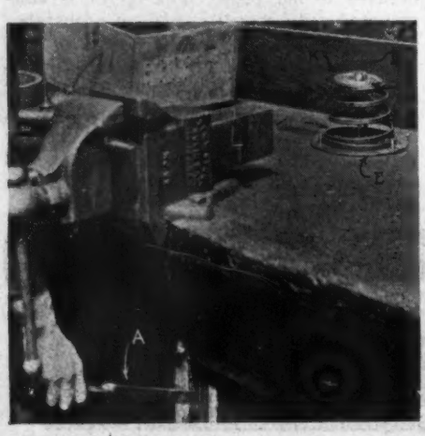
### Grip Improves the Screwdriver

The winding of the handle of a screwdriver with tape is good practice, which makes the efforts of gripping the handle with greasy hands less tiring and facilitates the setting up solidly of screws. However, a better method is to place a corrugated wooden rim over the ferrule of the driver 4 in. in diameter and 1 in. wide for use in the left hand. The advantages of this extra grip are appreciated when placing or removing a tight or rusted screw bolt. The driver can be twisted rapidly with the right hand, when free, but when extra force is required the rim permits of using the left hand and avoids tiring and straining the wrist of the right hand.

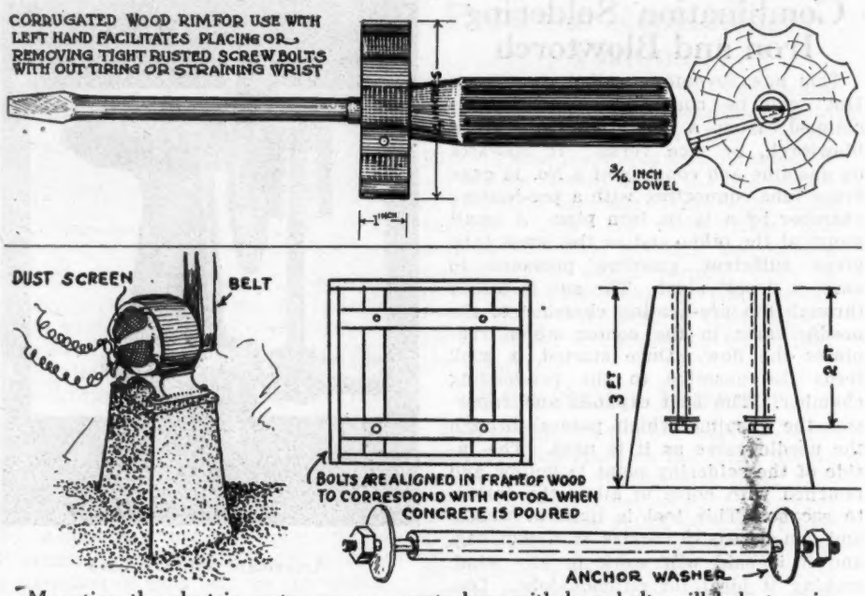
### Concrete Base for Mounting the Shop Motor

The motor for driving the machinery of the shop is not usually considered in the actual building details. However, the most substantial base for the motor is made from concrete, and this can be provided for when placing the concrete floor. It is desirable for several reasons to mount the motor on a pedestal base about 3 ft. high which permits of daily lubrication and cleaning. Mounting direct on the floor or in an overhead position is disadvantageous for reasons of dirt accumulations, neglect of oiling and difficulties of repair. The pedestal makes repairing and inspection work less difficult.

To construct the pedestal a form is made, the upper end several inches larger than the motor base, of wood. Into this the concrete is poured and left to harden. The bolts for anchoring the motor should be about 2 ft. long and imbedded in pipes set around them into the concrete. The lower end of the bolts



Ball bearings used to determine when spring surfaces are parallel




Mounting the electric motor on a concrete base with long bolts will help to minimize troubles from this source

are held with large washers over the heads of the bolts. When these long bolts are tightened down a small amount of stretch in the rod is obtained which holds the motor firmly on the pedestal.

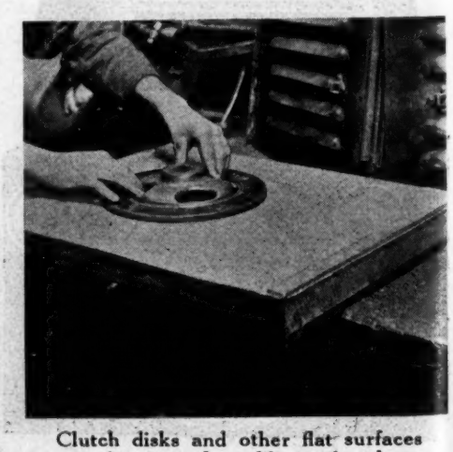
Short bolts are not desirable for bolting motors for the reason the vibration of running machinery loosens the short bolt due to the absence of a small amount of stretch in the bolt to allow of vibration. Where the long bolts are used the usual vibration of the motor and machinery is taken care of by the elasticity of the long bolt body. For this reason a motor held with 2-ft. bolts screwed down sufficiently to get some initial stretch in the bolting member stays set on the base and the motor held with short bolts is found loose at the base. So much depends on the shop motor in the operation of the shop that it is well to consider the details of mounting this unit to avoid future delays due to failures of the power plant.

### Determining Parallel of Clutch Spring Surfaces

How a ball bearing is used to show whether or not the two surfaces of clutch springs are parallel is shown at the left. Compound lever A is connected to a rod extending up through a plate E and ending in a link D. The spring to be tested is placed with the large end resting on plate E. Disk K is then placed on the upper surface of the spring, and held in place by a ball bearing, placed under the link D. The lever A is then pressed down, which contracts the spring as shown, and if the two surfaces of the spring are not parallel the disk tilts to one side causing the ball bearing B to roll to the lowest point. If the tolerance of deflection is not too great it can be remedied by grinding the spring.

### Plate for Grinding Flat Surfaces

The sketch shows a handy surfacing plate for grinding flat surfaces such as friction cluch disks. It consists of a heavy sandpaper 18 in. square held on a heavy board by means of two end plates. In grinding the surface of a disk the clutch disk is simply moved back and forth or in circle over sandpaper.



Clutch disks and other flat surfaces may be ground readily in the above manner

# Law in Your Business

By Wellington Gustin

## Have You a Legal Difficulty?

*SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted to him.*

## Calculation of License Fee

Q—I had my Essex car registered in Iowa in 1920 and paid $24, and this year they asked $28.40 for a model 5-A No. 6018 roadster. Was this car turned out this year and could they charge me this much difference in price?—John Kruse, Jr., Monning, Iowa.

The Iowa Statute requires every manufacturer of a motor vehicle sold or offered for sale, within the state, either by manufacturer or distributor, dealer or any other person, to file, annually, on or before the first day of June, in the office of the department a sworn statement showing the various models manufactured by him, and the retail list price and weight of each model as of June 1st of that year. No motor vehicle should be registered in Iowa unless the manufacturer thereof has furnished the above sworn statement, except that the County Treasurer has authority to fix the value and weight of any rebuilt or foreign car or any car on which the list price and weight is not available, subject to review of the department for correction.

Now, again, the rigistration fees are fixed by statute in Iowa, as follows, "For all motor vehicles except motor trucks, motor-cycles, and motor bicycles a fee equal to one per cent of the value as fixed by the Executive Council, plus 40 cents for each one hundred pounds or fraction thereof of weight of vehicle, as fixed by the Executive Council * * *."

**Value of Car When New the Basis**

"The Executive Council shall annually classify all motor vehicles by value and by weight. The value shall be fixed at the next even one hundred dollars above the retail list price when new f.o.b. the factory, and the weight shall be fixed at the next even one hundred pounds above the manufacturers' shipping weight or the actual weight of the vehicle fully equipped."

After the car has been registered five times that part of the license fee which is based on the value of said vehicle shall be one-half the weight as fixed when new.

With this information you or any owner or dealer can figure out just what you must pay as a proper license fee, and thus correctly answer your own questions.

My opinion is that the basis of calculation of fee is the value of the car when new, and this value does not fluctuate with the change in market or list price from year to year; that is if $24 was the correct charge for you for 1920, it should not be raised although this same model has advanced in price for the present year.

## Laws Governing Garages in Wisconsin

What are the laws of Wisconsin regarding the construction and operating of a public garage?—Geo. J. Guoef, Madison, Wis.

The construction of a garage will be governed by the local ordinances of the town where you intend to locate same. See the town or city officials. You will have to secure a license to operate or do business in compliance with the law. There are few special laws applying to the operation of garages in Wisconsin, it being a valid, lawful, and legitimate business, and so universally held.

See Section 3344, 3346t—Wisconsin statutes, 1919, volume 2. This will give you in full the lien law of your state granting a lien to the garagekeeper upon automobiles, etc., stored or repaired by him. The garagekeeper is permitted to retain possession of automobiles, etc., for the amount which may be due him for keeping and care of said property, until the amount due is paid—provided he has kept posted in some conspicuous place a card, stating the charges for storing, the sign being capable of being read at a distance of 15 ft. by any person entering the garage by entrances.

A lien is given the garagekeeper who alters, repairs or does any work on any detached accessory, fitting or part of an automobile, motorcycle or similar motor vehicle at the request of the owner or legal possessor thereof. This lien also is one of possession which must be retained, if the charges for such work or repairs remains unpaid, for a period of six months or more when the possessed article may be sold at public or private sale to pay the debt, the balance being paid to the county clerk to be held for the debtor. Before sale written notice must be given the debtor.

With this information you should be able to enforce your rights, and preserve them in apt time. Remember, you must retain possession to hold your lien, for if you give and allow a car or other property to be taken away your lien is gone.

## Car Damaged While Being Towed In

One of our best customers called us by telephone requesting that we send out a car to tow him in. When our driver got to the car he noticed that the car had no chains, and as the roads were very slippery he asked this customer whether he had any chains and was told that they would not be needed. Less than 20 ft. of rope was used, the customer driving his car. On the way in the car got beyond the control of the owner and it went over an embankment, turning half over. Damage was done to the extent of $350. Our car did not leave the road and the rope was not broken. Now the customer refuses to pay the bill. Can we insist upon this bill being paid? —A Reader.

This is the old case of negligence. The question therefore revolves itself upon the point, "Through whose negligence was the car caused to be overturned," thereby damaging the car to the extent of $350?

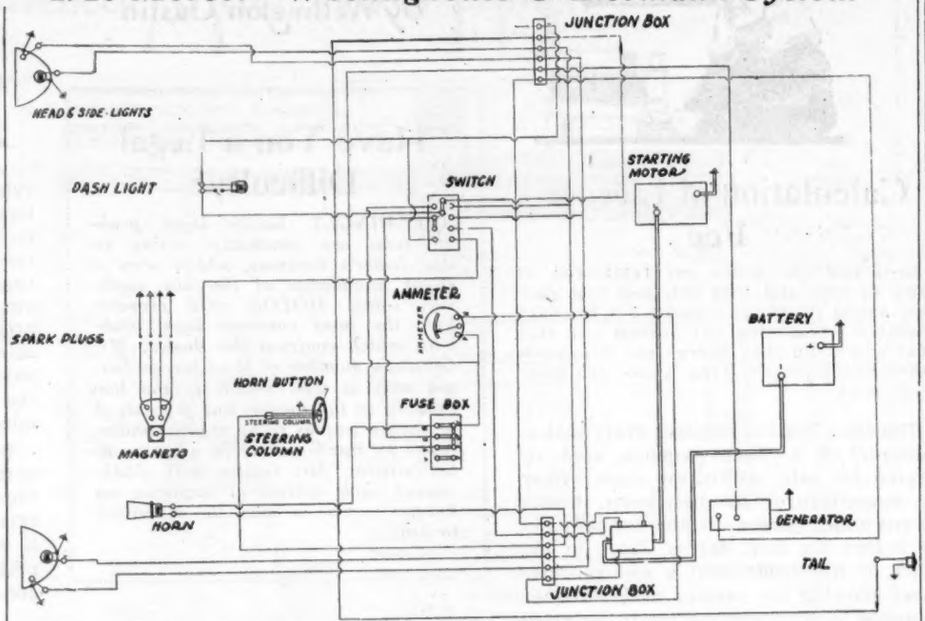
From the facts as you state them, it appears you are free from negligence and you could hold your customer for repairs made.

However, your driver knew that the car being towed in had no chains, and that the roads were very slippery. It was then his duty to drive at a moderate rate of speed, keeping in mind that the car being pulled in had no chains and that the roads were slippery.

If he drove at any unreasonable rate knowing these facts you would be liable, and you would have to show that your customer contributed to the negligence, such as not putting on the brakes when he should have done so, in order to free yourself of this liability.

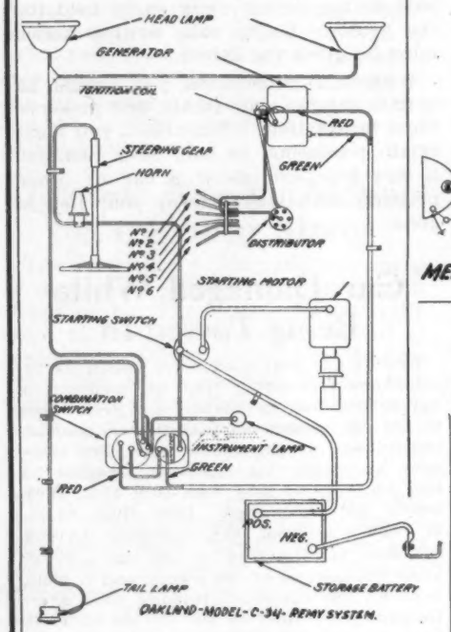
# Motor Age Weekly Wiring Chart No. 121

## 1920 Mercer—Westinghouse & Eisemann System



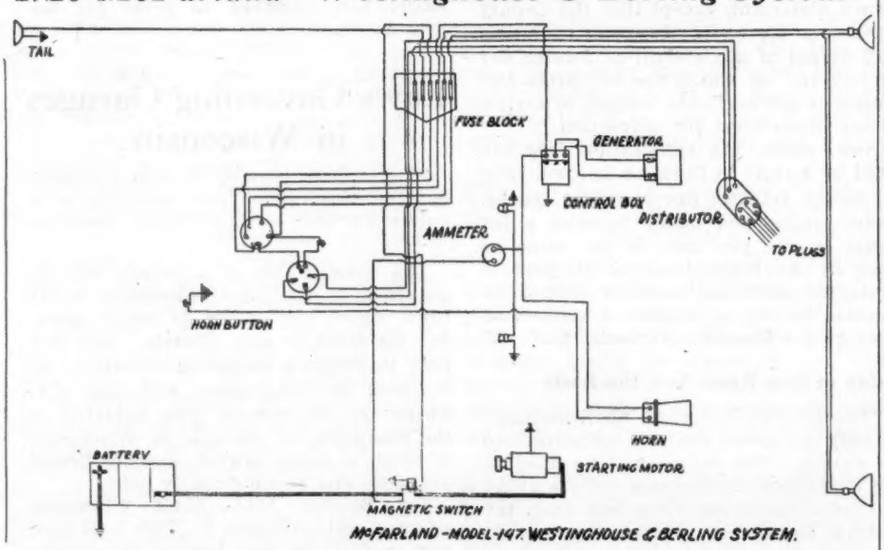

MERCER-WESTINGHOUSE AND-EISEMANN IGNITION SYSTEM.

## 1920 Oakland Remy System




OAKLAND-MODEL-C-34-REMY SYSTEM.

## 1920 McFarland—Westinghouse & Berling System




McFARLAND-MODEL-147 WESTINGHOUSE & BERLING SYSTEM.

### Name of Car and Date on Which Wiring Diagrams Have Appeared in Previous Issues

Allen—Sept. 30, '20
American Beauty—Feb. 17, '21
Buick—Dec. 23, '20
Cadillac—Nov. 18, '20
Case—Oct. 7, '20; Feb. 17, '21
Chalmers—Feb. 24, '21
Cleveland—Feb. 24, '21
Cole—Dec. 9, '20
Jan. 6, '21; Jan. 20, '21
Daniels—Feb. 17, '21
Dorris—Dec. 9, '20; Feb. 24, '21
Elcar—Oct. 28, '20
Dec. 2, '20
Elkhart—March 3, '20
Elgin—Oct. 14, '20
Franklin—Dec. 2, '20
Grant—Nov. 25, '20
Hudson—Jan. 13, '21
March 17, '21
Hupmobile—Feb. 3, '21
Jackson—Mar. 17, '21
Jordan—March 10, '21
King—March 3, '21
Kissel—Oct. 21, '20
Lexington—Dec. 16, '20
Mitchell—Jan. 6, '21
Moore—Nov. 11, '20
Moline-Knight—Nov. 4, '20
National—Dec. 16, '20
March 10, '21
Oldsmobile—Sept. 16, '20
Nov. 25, '20
Dec. 23, '20
Packard—Oct. 7, '20
Paige—March 10, '21
Peerless—Nov. 18, '20
March 3, '21
Premier—Feb. 10, '21
Reo—Feb. 10, '21
Roamer—Dec. 30, '20
Feb. 10, '21
Saxon—Oct. 21, '20
Dec. 30, '20
Scripps-Booth—Feb. 3, '21
Sheridan—Feb. 3, '21
Stearns—Nov. 4, '20
Jan. 13, '21
Stephens—Sept. 16, '20
Studebaker—Oct. 29, '20
Velie—Jan. 20, '21
Willys-Knight—Oct. 14, '20

**Additional Wiring Diagrams May Be Found in the Readers' Clearing House in This Issue**

# Passenger Car Serial Numbers

## *Motor Age Maintenance Data Sheet No. 142*

One of a series of weekly pages of information valuable to service men and dealers—save this page

*(Continued from last week)*

### CHALMERS

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1912 | 9 | 4 | $1400 | 18001-19252 |
| | 10 | 4 | 1800 | 20001-24000 |
| | 11 | 4 | 1500 | 27001-29166 |
| | 12 | 6 | 3250 | 24001-24300 |
| | 14 | 4 | 1750 | 4901- 4950 |
| 1913 | 16 | 4 | 1600 | 24301-25300 |
| | 17 | 4 | 1950 | 29500-33499 |
| | 18 | 6 | 2400 | 25301-27000 |
| 1914 | 24 | 6 | 2175 | 34500-38499 |
| 1915 | 26-A | 6 | 1800 | |
| | 26-B | 6 | 1850 | |
| | Aug. 1, 1914 | | 1700 | 38600-44999 |
| | Sept. 1, 1914 | | 1650 | |
| | 26-C | 6 | 1550 | 45000-45799 |
| | 29 | 6 | 2400 | 45801-47300 |
| | June 1, 1915 | | 2175 | |
| Serial numbers from here on are by **models** and not by **year** | | | | |
| | 32-A | 6 | 1400 | 47500-49599 |
| | July 1, 1915 | | 1275 | |
| | 32-B | 6 | 1350 | |
| | Aug. 1, 1915 | | 1450 | 50600-56999 |
| | April 1, 1916 | | 1350 | |
| | 35-A | 6 | 1050 | 55700-75699 |
| | April 20, 1916 | | 1090 | |
| | 35-B | 6 | 1280 | |
| | Jan. 1, 1917 | | 1350 | |
| | Nov. 1, 1917 | | 1450 | 75700-82000 |
| | Nov. 24, 1917 | | 1535 | |
| | April 8, 1918 | | 1615 | |
| | 35-B | 6 | 1765 | |
| | July 12, 1919 | | 1765 | 82000 up |
| | 35-C | 6 | 1250 | |
| | Nov. 1, 1917 | | 1365 | |
| | Nov. 24, 1917 | | 1485 | 94001 up |
| | April 8, 1918 | | 1565 | |
| | July 12, 1919 | | 1685 | |

Number on 1915-16 models on left frame member under front boards. Number on 1916-17-18-19 models on left front horn of frame

### CHAMPION (Formerly Direct Drive)

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1918 | ..... | 4 | ..... | 101-113 demonstrating models only |
| 1919 | C & CS | 4 | $1150 | C-100—C216 |
| 1920 | C-4 | 4 | ..... | C-300 up |

Number plate on body under seat

### CHANDLER

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1913 | 14 | 6 | $1785 | 1-550 |
| 1914 | 15 | 6 | 1785 | 551-250 |
| 1915 | 15B | 6 | 1295 | 2501-4000 |
| 1916 | 16 | 6 | 1295 | 4001-15000 |
| 1917 | 17 | 6 | 1295 | 15001-35000 |
| 1918 | New Series | 6 | ..... | 35001-65000 |
| 1919 | New Series | 6 | ..... | 65001 up |
| 1920 | New Series | 6 | 1895 | |

Number on right front engine arm up to car number 72000; cars numbered above 72000 the serial number is on frame under right headlight and fender

### CHEVROLET

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1913 | C | 6 | $2100 | |
| 1914 | H-2 | 4 | 750 | |
| | H-4 | 4 | 875 | |
| | L | 6 | 1475 | |
| | C | 6 | 2500 | |
| 1915 | H-2 | 4 | 750 | |
| | H-4 | 4 | 875 | |
| | L | 6 | 1425 | |
| 1916 | 490 | 4 | 490 | |
| | H-4 | 4 | 750 | |
| 1917 | 490 | 4 | 490 | |
| | F-5 | 4 | 800 | |
| | D-5 | 8 | 1385 | |
| 1918 | 490 | 4 | 635 | |
| | FA-5 | 4 | 935 | |
| | D-4 | 8 | 1385 | |
| | D-5 | 8 | 1385 | |
| 1919 | FA-5 | 4 | 1045 | |

As Chevrolet cars are numbered by manufacturing zones it is not possible to reproduce the numbers in such a way as to be of use to the dealer. In case of doubt write the Chevrolet Motor Co., 1764 Broadway, New York City

### CHEVROLET (Continued)—

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| | D-4 | 8 | 1385 | |
| | D-5 | 8 | 1385 | |
| | FB-5 | 4 | 1135 | |
| | 490 | 4 | 735 | |
| 1920 | FB-50 | 4 | 1135 | |
| | 490 | 4 | 735 | |

### CLEVELAND

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1919 | 40 | 6 | $1385 | 1001 up |
| 1920 | ..... | .... | ..... | Number plate on right hand frame members about 12 inches from frame; engine number front of crankcase under oil filler. |

### COLE

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1912 | Large 4 | 4 | ..... | 5000-7000 |
| | Small 4 | 4 | ..... | 5000-7000 |
| 1913 | 4-40 | 4 | ..... | 9000-10000 |
| | 4-50 | 4 | ..... | 7000-9000 |
| | 60-Big 6 | 6 | ..... | 10000-11000 |
| 1914 | Series 9 | 4 | ..... | 16000-17012 |
| | Series 9 | 6 | ..... | 14000-15000 |
| 1915 | 660 | 6 | ..... | 15000-15175 |
| | 666 | 6 | ..... | 15175-16000 |
| | Series 10 | 4 | ..... | 18000-20000 |
| | Series 10, Little 6 | 6 | ..... | 20000-22000 |
| | 440 | 4 | ..... | 22000-23000 |
| | 650, Sensible 6 | 6 | ..... | 23000-24000 |
| | 651, Little 6 | 6 | ..... | 24000-25000 |
| | 850 | 8 | ..... | 27000-30000 |
| 1916 | 666, Big 6 | 6 | ..... | 15175-16000 |
| | 860, Series 30 | 8 | ..... | 30000-40000 |
| 1917 | 860, Series 40 | 8 | ..... | 40000-50000 |
| 1918 | 870 | 8 | ..... | 50000-59478 |
| 1919 | | | | |
| 1920 | 870 | 8 | ..... | 59339 up |

Number on right front spring hanger and on under right front seat cushion

### COLUMBIA

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1917 | A | 6 | $1250 | 501-1310 |
| | B | 6 | 1345 | 1-297 |
| 1918 | C | 6 | 1350 | 2000-3199 |
| | D | 6 | 1450 | 501-889 |
| | C-S | 6 | 2445 | 1850-1950 |
| 1919 | C | 6 | 1600 | 3201-3389 |
| | D | 6 | 1745 | 1000-1132 |
| | | | | Number on front seat heel board |
| | E | 6 | 1845 | 101 up |
| | H | 6 | 2850 | 100 up |
| | C-S | 6 | 2445 | 1951-1968 |
| 1920 | C | 6 | 1695 | 4000 up |
| | D | 6 | 1845 | 1400 up |
| | | | | Number on front toe board |
| | E | 6 | ..... | |
| | C-S | 6 | 2850 | 2000 up |
| | | | | Number on front toe board; engine numbers mixed |

### COMET

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1917-18 | C-51 | 6 | ..... | 1-500 |
| 1919 | C-52 | 6 | ..... | 500 up |
| | | | | Number plate on left hand side of dash under hood |

### COMMONWEALTH

| Year | Model | Cyls. | Price | Serial Numbers |
|---|---|---|---|---|
| 1913 | 38 | 4 | $975 | A1000-A1366 |
| 1914 | 38 | 4 | 975 | B203-A411 |
| | 20 | 4 | 495 | B001-B174 |
| 1915 | 38 | 4 | 1075 | A966-B36 |
| | 20 | 4 | 495 | C195-CX17 |
| 1916 | 32 | 4 | 895 | CX2-C194 |
| 1917 | 40 | 4 | 995 | D219-D479 |
| 1918 | 40 | 4 | 995 | DX732-DO883 |
| 1919 | 40 | 4 | 1395 | ——— 41999 |
| 1920 | 40 | 4 | 1395 | 42000 up |
| | | | | Number plate on cowl |

# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

| | | |
|---|---|---|
| Detroit | Annual Automobile Show | March 19-26 |
| Peoria, Ill. | Automobile Show | March 19-26 |
| Torrington, Conn. | Annual Automobile Show | March 20-26 |
| Cedar Rapids, Ia. | Automobile Show | March 21-26 |
| Deadwood, S. D. | Annual Automobile Show | March 21-26 |
| Norfolk, Va. | Annual Automobile Show | March 21-26 |
| Oneonta, N. Y. | Annual Automobile Show | March 21-26 |
| Fort Worth, Tex. | Automobile Show | March 21-26 |
| Ottumwa, Ia. | Annual Automobile Show | March 23-25 |
| Greenfield, Mass. | Automotive Show | March 28-April 2 |
| Columbia, S. C. | Automotive Show | March 28-April 2 |
| New Britain, Conn. | Automotive Show | March 30-April 2 |
| Lewistown, Pa. | Annual Show | March 30-April 2 |
| Chattanooga, Tenn. | Annual Automobile Show | April |
| Bridgeton, N. J. | Annual Automobile Show | April 2- 9 |
| Gloversville, N. Y. | Annual Automobile Show | April 3- 9 |
| Denver | Automobile Show | April 4- 9 |
| Seattle | Annual Automobile Show | April 4- 9 |
| Mexico City | Automobile Show | April 20-May 5 |
| Buffalo | First Annual Motors and Sportsmen's Show | April 11-16 |
| Oklahoma City | Annual Automobile Show | April 11-16 |
| Charlotte, N. C. | Carolinas Automobile Show | April 11-16 |
| Red Bank, N. J. | Annual Automobile Show | April 16-23 |
| Goldsboro, N. C. | Automobile and Industrial | April 20-23 |
| Lincoln, Ill. | Automobile Show | April 21-29 |

## RACES

| | | |
|---|---|---|
| Indianapolis Sp'w'y. | 500 Mile Race | May 30 |
| Uniontown Sp'w'y. | | June 18 |
| Cincinnati | Speedway Race (Possible) | July 4 |
| Tacoma | Speedway Race | July 4 |
| Le Mans | French Grand Prix | July 25 |
| Elgin | Road Race (Possible) | August 3 |
| Pikes Peak | Hill Climb | September 5 |
| Uniontown Sp'w'y. | Annual Autumn Classic | September 5 |
| Los Angeles | Speedway Race | November 24 |

## CONVENTIONS

| | | |
|---|---|---|
| Buffalo, N. Y. | Factory Service Managers | March 17-19 |

## Business Notes

**J. W. Currie,** Edward Currie and J. S. Currie, of Atlanta, have organized and incorporated Currie Brothers Co., with $250,000 capital, to establish a business in Atlanta as distributors of automobiles, trucks and tractors.

**The Bickett Rubber Corp.** of Watertown, Wis., has been chartered to engage in the manufacture of rubber products of all kinds. The capital is $100,000 preferred and 2,000 non-par valued common stock.

**The Oldfield Tire Co.** of Akron announces the appointment of J. M. Dine, identified with the rubber industry in various capacities for the past fourteen years, as vice-president and general manager. Other officers recently chosen were B. M. Robinson, secretary; H. L. Allsopp, treasurer, and M. E. Moffett, assistant treasurer.

**The Duplex Storage Battery Co.,** which moved its works from Milwaukee to Beaver Dam, Wis., several months ago, has reorganized its official personnel and management. The new officers are: President, J. W. Deniger, Beaver Dam; vice-president, Herman L. Schickel, Milwaukee; secretary-treasurer, M. A. Jacobs, Beaver Dam; general manager, Peter M. Kettenhofen; factory superintendent, Joseph Mollerus; directors, John V. Zweck, Beaver Dam, and A. H. Luckenbach, Chicago.

**The Jorgensen Mfg. Co.,** Waupaca, Wis., at its annual stockholders' meeting elected Charles L. Bryden, Berlin, Wis., and E. H. Jones, Weyauwega, Wis., to the board of directors to succeed J. W. Braun and William F. Timm, and re-elected P. F. Jorgensen, C. H. Jorgensen and Julius C. Jorgensen. The financial statement of the company as of Dec. 31, 1920, showed total assets of $266,397.60, inclusive of cash on hand and accounts receivable to the amount of $131,101.42. The total current liabilities on that date were $20,581.07, including a mortgage on the property of the company and unpaid dividends.

**The Auto Life Tire Chain Co.** of Milwaukee, which established a factory at Cedarburg, Wis., several months ago, is increasing production to meet orders from jobbers and dealers. At the annual meeting the following officers were elected: President, E. A. Hoya; vice-president, A. L. Wolff; secretary, William F. Schad; treasurer, F. A. Andree.

**The U. S. Tractor & Machinery Co.,** Menasha, Wis., at its annual meeting decided to increase the capital stock from $500,000 to $800,000 to accommodate the development of the business. During the year the manufacturing area has been increased from 7500 to 25,000 sq. ft. All of the facilities have been in production steadily, and since Feb. 1, some departments are operating overtime, and night shifts are in prospect. Branches have been established at Kansas City, Minneapolis, Springfield, Ill., and New York City. W. O. Otis has been appointed sales manager to fill the vacancy caused by the resignation of E. J. Perkins. The tractor line has been increased from one to three models, and the line of governor pulleys from one size to six. The former officers were re-elected.

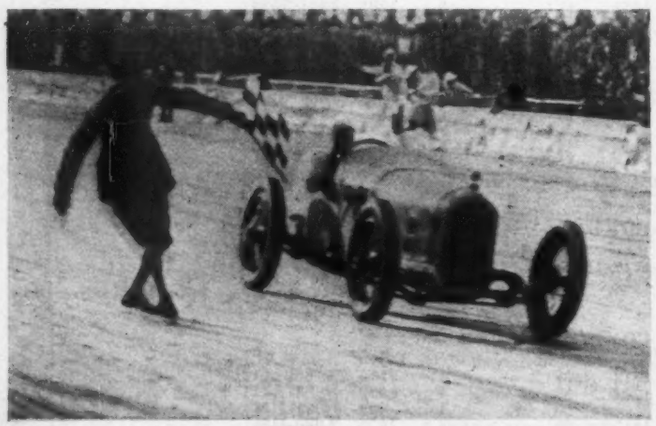
**Profits of the F. B. Stearns Co.,** for 1920 exceeded those of 1919 by about 10 per cent, stockholders were informed at the annual meeting. Business for January was as good as in the same month of 1920 and the company now is operating at about 95 per cent of normal. The parts business has been entirely satisfactory and the company now makes every part that goes into the Stearns car. Richard Garlick, treasurer of the Youngstown Sheet & Tube Co. was elected a director to succeed Paul Wick of Youngstown who resigned. The other directors were reelected.

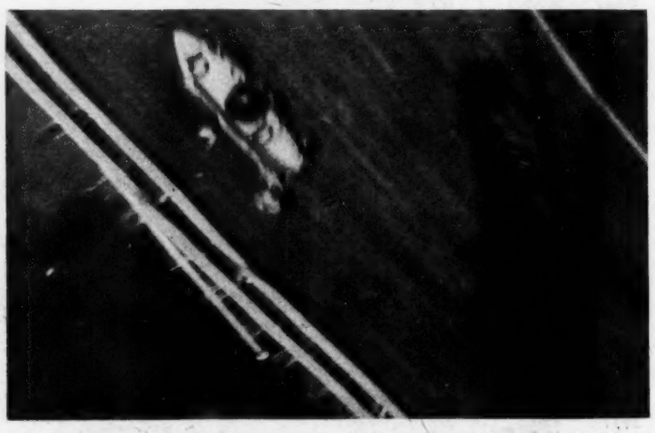
**Rauch & Lang, Inc.,** now are settled in their new factory at Chicopee Falls, Mass. The plant is entirely new and was built and equipped especially for the manufacture of Rauch & Lang electric automobile. Bodies are being built by the Baker Rauch & Lang Co., of Cleveland but the chassis parts are being manufactured almost entirely at Chicopee Falls. The company reports that the number of orders coming in exceeds expectations and that it looks for a good spring business.

**The Clum Mfg. Co.,** Milwaukee, Wis., has increased its authorized capitalization from $100,000 to $250,000 to accommodate the growth of its business. It is a large manufacturer of ignition and carburetion devices and other automotive devices, appliances and specialties. Valentine Fina is president and general manager.

**The Jig Bushing Co.,** makers of bushings for automobile plants, will start production on a full line of its products at its new factory in Pontiac, Mich., April 1. The concern is a new one in the local field and is owned by O. R. Briney of Pontiac and L. M. Richards of Cleveland.

**The U. S. Radiator Corp.,** Detroit, in its statement as of Jan. 31, reports the most successful year in the company's history with gross earnings of $1,321,568.98 compared with $1,113,828.00 the previous year and $1,227,459.00 in 1918, the company's best previous year. Operating profits were $1,220,214.68 and total income less interest charges was $1,130,674.65. Net earnings were $927,059.51 after charges of $203,615.14 for depreciation on plant and equipment. This total was approximately $150,000 greater than in 1918.





**Ralph De Palma in a Ballot (left) averaged 107.3 miles an hour in the fifty-mile race on the Beverly Hills speedway in the opening event of the new championship season. Roscoe Sarles (right), piloting a Duesenberg, boomed around the Beverly bowl at 106 miles an hour. He won the second heat, averaging 107 miles, but came home third in the final. This picture was snapped from an aeroplane—note its shadow**